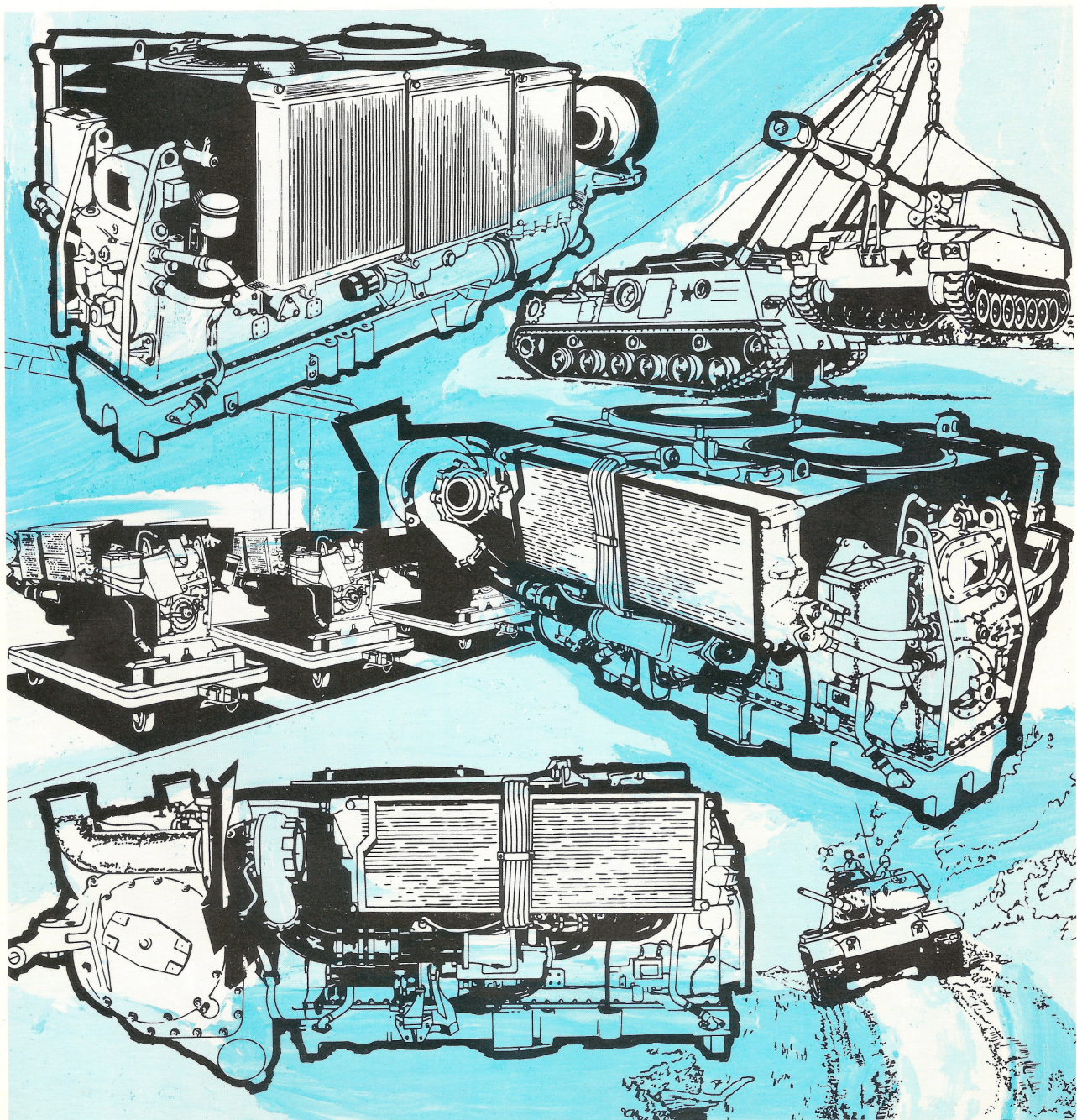


 **TELEDYNE**  
**CONTINENTAL MOTORS**  
**General Products**

The Home of Power Dependability

# AIR-COOLED DIESEL TANK ENGINES





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# **AIR-COOLED DIESEL TANK ENGINES**

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# **POWER DEPENDABILITY Since 1902**

Teledyne Continental Motors General Products Division is the largest manufacturer of air-cooled tank engines in the free world.

Since 1902, when the first Continental engines were introduced to the new and rapidly expanding automotive marketplace, customers located throughout the world have enjoyed the power dependability provided by Continental engines.

Today, Continental engines are used exclusively to power the U.S. Army's M60 Main Battle Tank and by nations of the free world for powering their tanks and armored vehicles.

Continental engines are manufactured at the Getty Street Plant of Teledyne Continental Motors General Products Division. These modern production facilities are located at Muskegon, Michigan — a major industrial community situated in Western Michigan on the easternly shores of Lake Michigan. The plant encompasses nearly one-million square feet of floor space and is built on 455.6 acres of prime industrial property. A special vehicle test track is used for "field testing" vehicles and power packages. Vehicle obstacle tests are conducted on slopes, grades, water, mud and Belgian Blocks constructed on some 95.2 acres of rough terrain. These obstacles are used routinely to test both tracked and wheeled vehicles.

The plant's modern production facilities include automated and tape-controlled machining equipment, modern heat-treating installations, automated test cells, computers and digital readout test equipment and electron-beam welding machines.

Looking back, the company has come a long way since first providing engines for powering of the original Ford Model "A" truck which was used extensively during World War I.

In 1931, Continental engineers designed the first air-cooled aircraft engine. This lightweight, four-cylinder engine, the Continental A-40, has served as the basic design criterion used in the design and manufacturing of today's aircraft engines. This highly significant "break-through" in reciprocating engine design expertise was also used by the company to develop the world's first air-cooled, radial type tank engine. This new and dependable engine was used to power the U.S. Army's M3 and M4 tanks during World War II.



During World War II, the company was primarily engaged in the production of engines for five military programs. These vital programs included engines used for powering of marine landing craft, trucks, tanks, fighter aircraft, bombers and training type aircraft. Employment during this peak production period exceeded 14,000 people.

During 1939, the company expanded production facilities by constructing a manufacturing plant in Detroit, Michigan. During those peak production years the plant manufactured both aircraft engines and the new air-cooled radial type tank engine.

Since 1934, more than 175,000 tank engines have been manufactured including engines used to power all the U.S. Army's T-Series and M-Series tanks.

In 1943, the company again expanded its plant facilities for the manufacture of the "Merlin" aircraft engine. This was the powerful Rolls-Royce engine used for powering the famed P-51 Mustang Fighter Plane.

During the late 1940's the company developed both the AV-1790 and AOS-895 Series gasoline tank engines. These 12-cylinder and six-cylinder, lightweight air-cooled gasoline engines were used to power all the U.S. Army's tracklaying vehicles including tanks, self-propelled weapons and cargo carriers.

In addition to the manufacture of tank engines, the company built over 91,000 multi-fuel type engines used for powering the U.S. Army's 2-1/2 and 5-ton trucks.

In 1959, the company introduced the world's first air-cooled diesel tank engine. It was designated the AVDS-1790 Series engine. Primary engine features are Vee-design, air-cooling, fuel injection, supercharging and capability of underwater operation using a snorkel.

Today, the AVDS-1790 Series engine is used by many nations of the free world for repowering their M47, M48 and Centurion tanks. It is a product improved engine and is available in horsepower ranging from 750 to 1200 horsepower.



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# FIVE DECADES OF EXPERIENCE

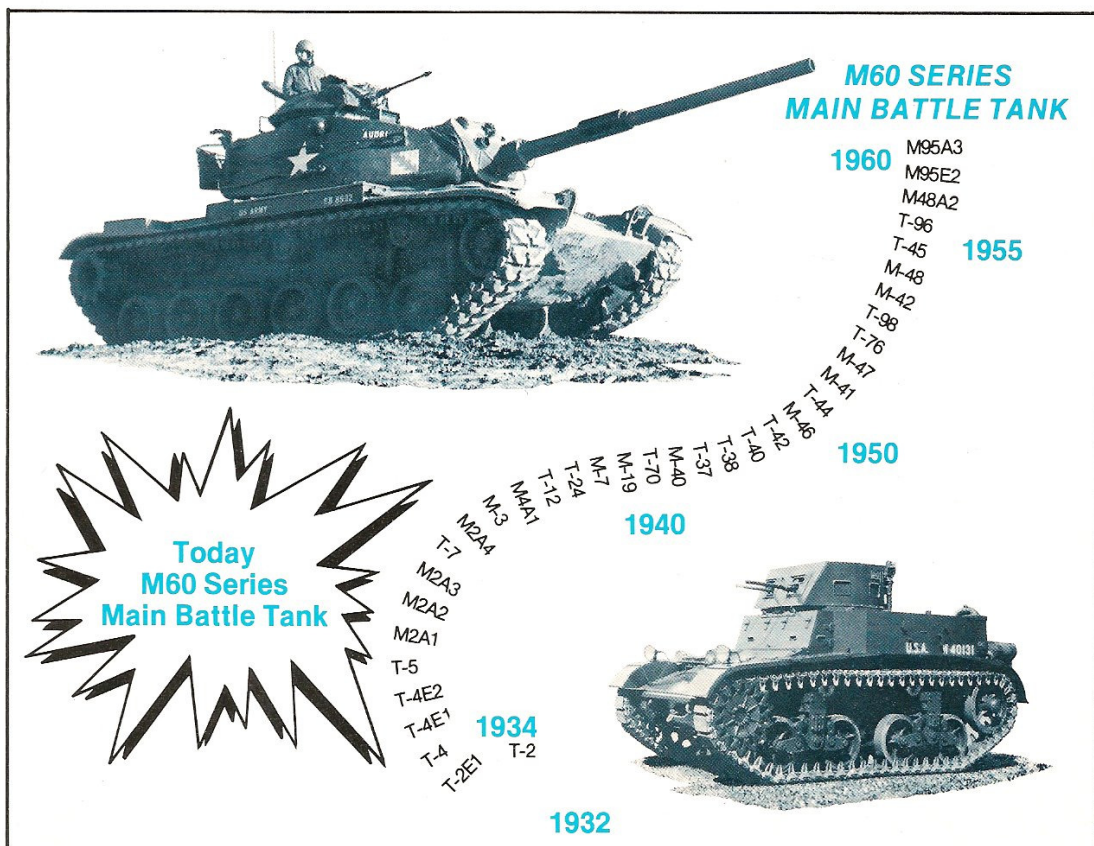
Teledyne Continental Motors General Products Division has over five decades of tank engine design, manufacturing experience.

In 1932, the first Continental air-cooled tank engine was introduced in the U.S. Army's M1 Combat Car. The new Model W670 Tank engine represented a major "break-through" in reciprocating engine design. The 7-cylinder radial type engine produced 250 horsepower at 2400 rpm.

In 1934, the W670 engine was used to power the U.S. Army T2 Light Tank. The T2 had a top speed of 35 mph and weighed some 12,705 pounds unloaded. The W670 engine was used to power all early-day U.S. Army tanks.

Today, the Teledyne Continental AVDS-1790-2C Series engine is used exclusively by the U.S. Army to power the M60 Series Main Battle Tank. The AVDS-1790-2C engine is rated at 750 horsepower. It is air-cooled, turbocharged, diesel fuel injected and also features the 12-cylinder Vee-design. The M60 Series tank weighs 55-tons and has a maximum speed of 30 mph.

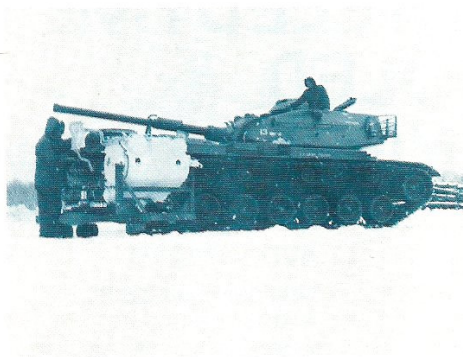
Since 1934, the company has manufactured more than 175,000 tank engines. Teledyne Continental Motors General Products Division tank engines have provided and continue to provide power dependability for all T-Series and M-Series U.S. Army tanks through the M60 series.





# WORLDWIDE DEPLOYMENT

Military vehicles powered by Teledyne Continental Motors General Products Division diesel engines are operating successfully throughout the free world. These engines are designed to provide reliable and dependable operation in all environmental and temperature extremes. The engines are capable of starting and operating at temperatures ranging from minus 25-degrees to 125-degrees Fahrenheit. Minus 65-degree operation is available with starting aids.



**ARCTIC OPERATIONS**



**DESERT ENVIRONMENT**

The company has developed and incorporated other special features into its current family of high performance, air-cooled diesel engines.

- Waterproof and submersible for fording.
- Operable on compound slopes and grades by use of a specially designed oil system.
- Low voltage protection for starter.
- Dust detector for protection against clogged filters causing power loss and engine damage.
- Fuel filter with water separator for protection against impure or contaminated fuel.
- All gear drive to eliminate problems with broken or slipping belts.
- Smoke generator integrated with engine to provide

obscuration without extra fuel mixtures or separate equipment.

- Capability to operate separately outside the tank engine compartment (ground-hop) for final inspection or adjustment.
- Protective guards located to prevent damage to external components during installation or removal.
- Air-cooled to eliminate maintenance required for liquid-cooled engines and provide an engine with minimum bulk and weight.

# COMBAT VEHICLES

**in use today powered  
with the AVDS-1790  
Series Diesel Tank Engine.**

## LIST OF COMBAT VEHICLES POWERED BY TELEDYNE AIR-COOLED DIESEL ENGINES

### AVDS-1790-2A

#### Original Equipment

- M60 & M60A1
- M60A1E1 & M60A1E2
- M60 AVLB
- M728 CEV (165mm)

#### Retrofit

- M47
- M48

### AVDS-1790-2AC

#### Retrofit

- Centurion

### AVDS-1790-2AR

#### Original Equipment

- M88

### AVDS-1790-2C

#### Original Equipment

- M60A1 — M60A3
- M60 AVLB

### AVDS-1790-2D

#### Original Equipment

- M60 & M60A1
- M48A3
- M48A5

### AVDS-1790-2DR

#### Retrofit

- M88

### AVDS-1790-2CC

#### Retrofit

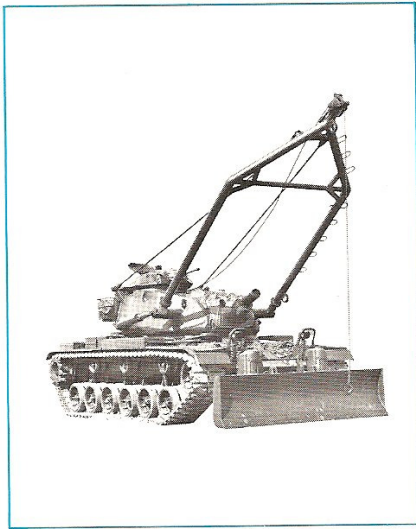
- Centurion

### AVDS-1790-2DC

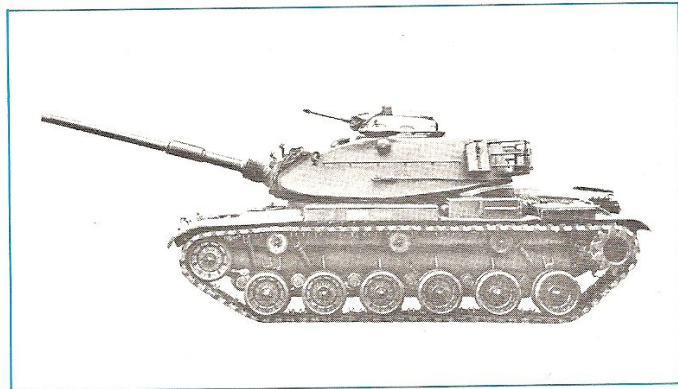
#### Retrofit

- Centurion

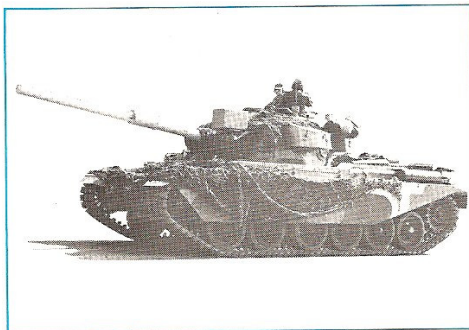




M728

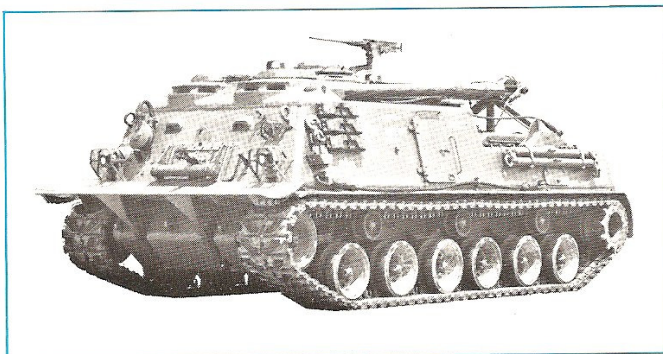
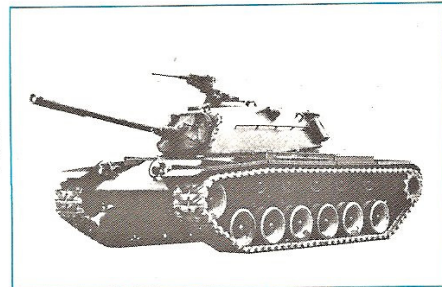


M60 SERIES TANK

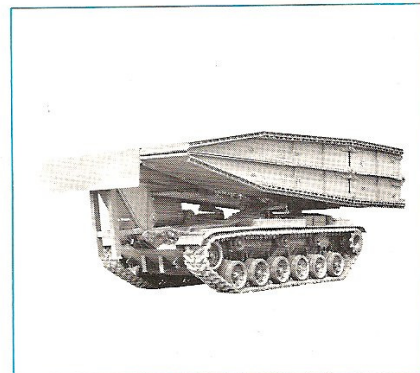


CENTURION  
TANK

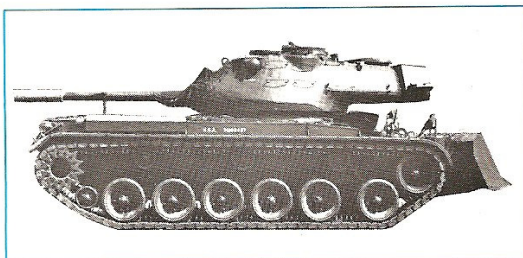
M48  
SERIES  
TANK



M88 RECOVERY VEHICLE



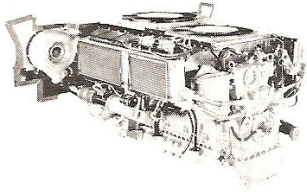
M60 AVLB



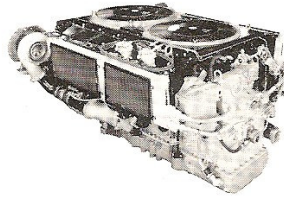
M47  
SERIES  
TANK

Combat vehicles currently powered with the AVDS-1790 Series air-cooled diesel tank engine.

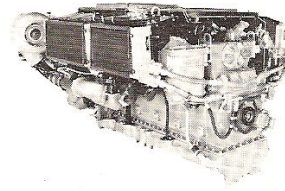
### ORIGINAL SERIES



AVDS-1790-2A  
750 H.P.

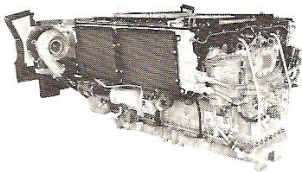


AVDS-1790-2AC  
750 H.P.

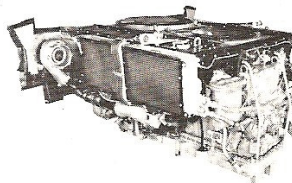


AVDS-1790-2AR  
750 H.P.

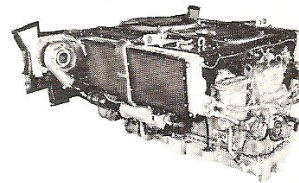
### PRODUCT IMPROVED CURRENT SERIES



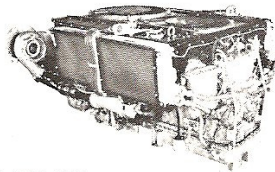
AVDS-1790-2C  
750 H.P.



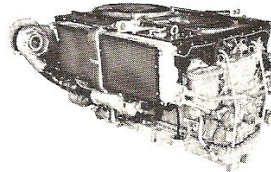
AVDS-1790-2D  
750 H.P.



AVDS-1790-2DR  
750 H.P.

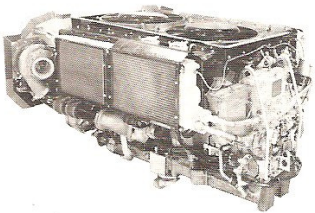


AVDS-1790-2CC  
750 H.P.

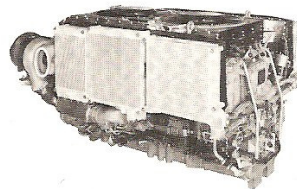


AVDS-1790-2DC  
750 H.P.

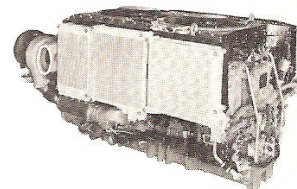
### HIGHER HORSEPOWER SERIES



AVDS-1790-5A  
908 H.P.



AVDS-1790-8A  
1050 H.P.



AVDS-1790-9A  
1200 H.P.





### **ORIGINAL SERIES**

The Original Series engine is rated at 750 horsepower. It is used as the primary equipment in the U.S. Army's M60 Series Main Battle Tank. The AVDS-1790-2AR engine is a modified AVDS-1790-2A engine used for retrofitting the M88 Recovery Vehicle. The AVDS-1790-2AC also is a modified AVDS-1790-2A engine and is used for repowering the Centurion Mark Series Main Battle Tanks.

### **PRODUCT IMPROVED CURRENT SERIES**

The Product Improved Current Series engines represent the second generation of the AVDS-1790 Series diesel engine family. There are two Product Improved engine models — The AVDS-1790-2C engine which is equipped with a 650 ampere oil-cooled alternator and the AVDS-1790-2D engine which is configured with the 300 ampere generator. The AVDS-1790-2DR engine is configured specifically for the U.S. Army's M88 Recovery Vehicle, and the AVDS-1790-2CC and AVDS-1790-2DC Series engines are used to retrofit Centurion Tanks.

### **HIGHER HORSEPOWER SERIES**

The Higher Horsepower Series engines are based on the Product Improved Current Engine Series. The 908 horsepower engine is similar to the 750 horsepower engines with the exception that increased cooling has been provided. Both the 1050 and 1200 horsepower engines are increased horsepower versions of the Product Improved Current Series engines. These Higher Horsepower Series engines have a fixed low-compression ratio, increased cooling, induction air and a modified fuel injection system.

# POWER PACKS

## TYPICAL M60 MAIN BATTLE TANK POWER PACK

Teledyne Continental Motors General Products Division has available engine and transmission power packs ready for vehicle installation.

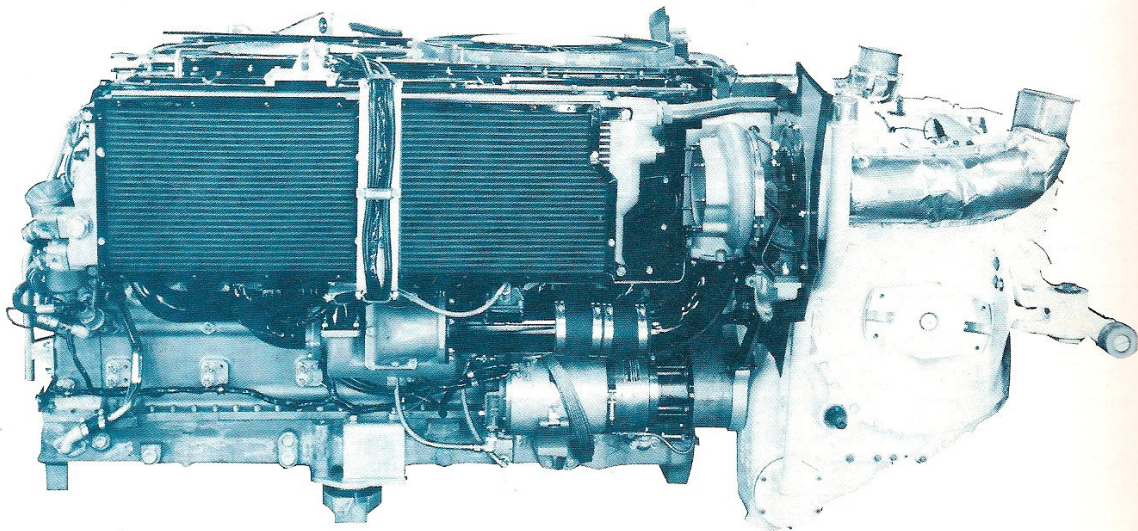
Each individual power pack is "mated" and performance tested at the factory prior to shipment.

A typical power pack for the M60 Series Main Battle Tank consists of an AVDS-1790-2C Series (RISE) engine "mated" to the General Motors Allison Division Model CD-850-6A transmission.

The AVDS-1790-2C (RISE) engine is a product improved power plant. It is rated at 750-horsepower. Special features include air-cooling, fuel injection, 12-cylinder turbocharging and modular construction. The AVDS-1790-2C diesel engine is used exclusively to power the U.S. Army's M60 Series tanks.

The Allison CD-850-6A transmission is a "full-torque" shifting transmission. It delivers power to both the right and left sprocket drive shafts of tracked vehicles.

The CD-850-6A transmission features fully automatic operation with driver over-control, torque converter with lockup clutch and triple differential steering.



AVDS-1790-2C  
SERIES ENGINE

CD-850-6A  
TRANSMISSION



## **NEW HIGH PERFORMANCE POWER PACK**

The new High Performance Power Packs are designed to power both medium and heavy tracked vehicles.

The AVDS-1790-5A (908 Horsepower) and AVDS-1790-8A (1050 Horsepower) engines may be coupled with the RENK Model RK-304 transmission.

The AVDS-1790-9A (1200 Horsepower) engine may be coupled either with the RENK Model RK-304 or RENK HSWL 284 transmissions.

These High Horsepower Series engines may also be coupled with either the Zed F LSG-3000 or the Allison X1100 (XT-1410) transmissions.

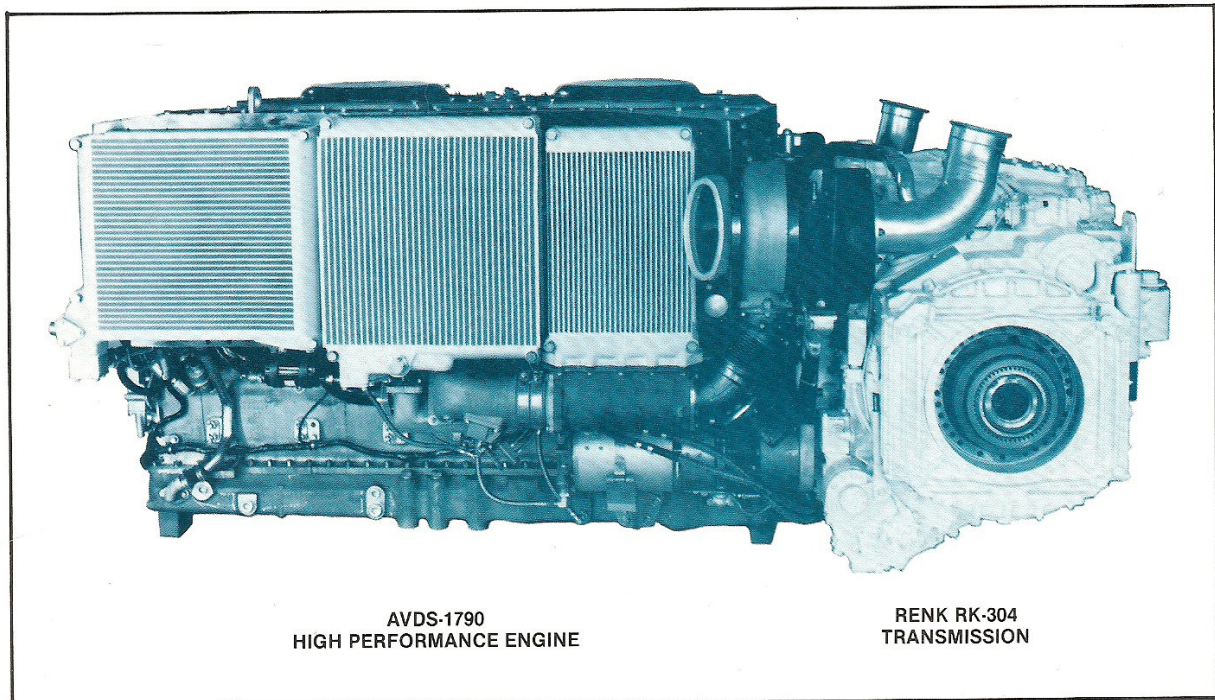
Both the AVDS-1790-8A and the AVDS-1790-9A Series engines feature fixed low compression ratio, increasing cooling capabilities, induction air and modified fuel injection. Engine components are interchangeable with the lower horsepower engines and the exteriors are similar. These benefits provide superior performance and power dependability in a compact installation package.

The RENK Model RK-304 transmission is a hydro-mechanical power shift unit. It features hydro-mechanical power shifting, with integrated reversing and steering. The RK-304 is especially designed for medium and heavy tracked vehicles requiring a gross engine power rating of up to 1200-horsepower.

The RK-304 transmission uses a torque converter with a lockup clutch. The torque converter is directly coupled to the engine crankshaft and eliminates the requirement of an engine flywheel. The RK-304 allows pivot steering in neutral, with two rotational speeds available. It has four forward and two reverse gear ranges and the vehicle may either be towed or push started.

The RK-304 transmission has both manual and fully automatic electric shift controls.

The AVDS-1790 high performance power packs are designed for easy adaptation to existing vehicles.

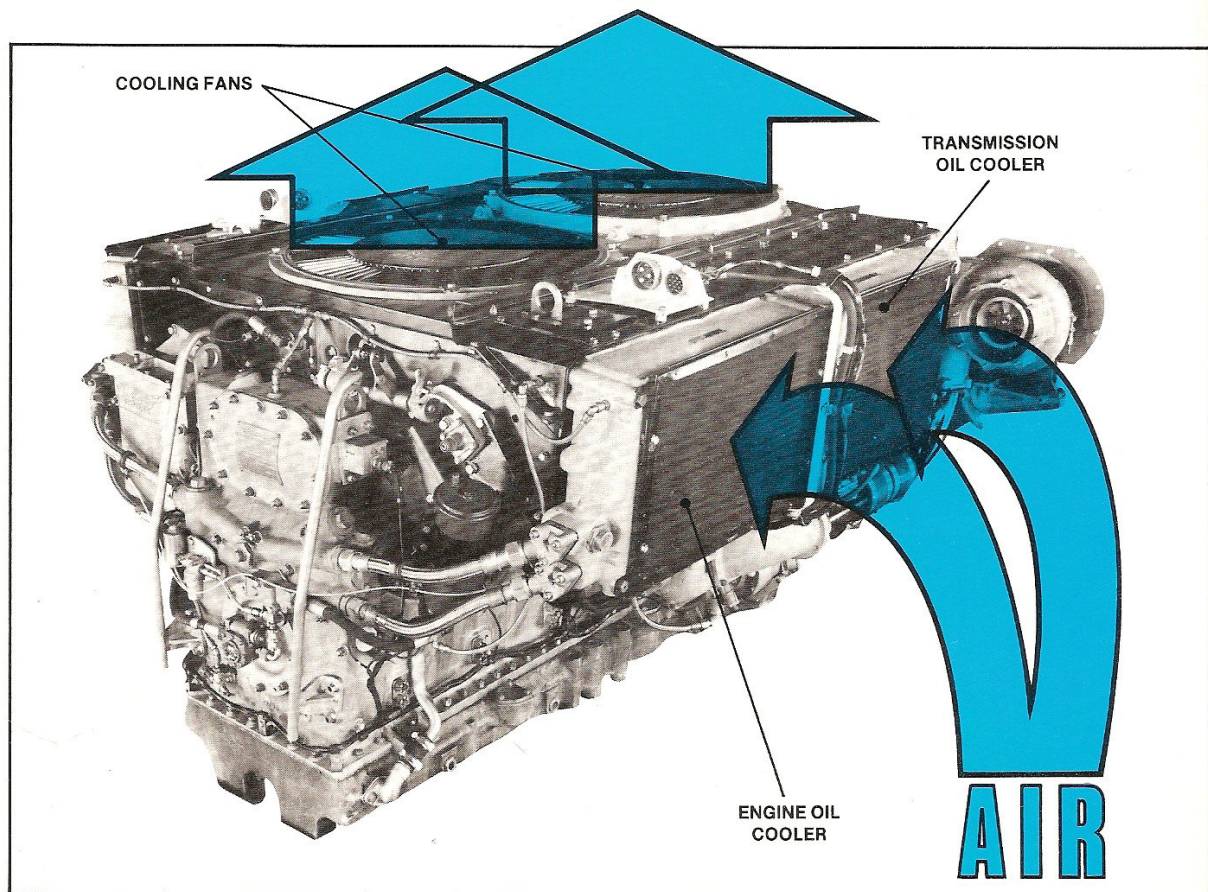




# THE AIR-COOLED DIESEL TANK ENGINE

The air-cooled diesel tank engine has eliminated the maintenance and service burden required by engines using liquid type cooling systems. Air-cooled engines are very easy to service and repair since the hardware and plumbing required of liquid cooled units has been eliminated. In addition, air cooling provides the following power plant advantages.

- Engine bulk is reduced with the elimination of water jackets and plumbing.
- Weight reduction savings is achieved with the elimination of water jackets and liquid cooling hardware.
- Increased engine power-to-weight ratio is possible with the weight savings.
- Engine power loss is reduced with the elimination of water pumps and liquid circulatory systems.
- Operating temperature limitations are reduced with the elimination of antifreeze and coolant requirements.
- Logistic and maintenance problems are reduced with the elimination of liquid type coolant hardware.



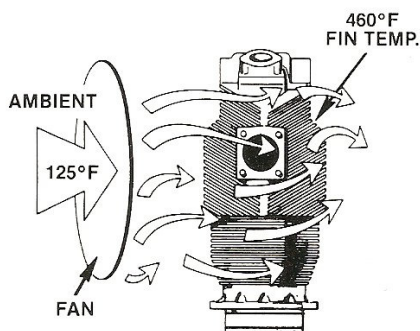


# THE COOLING SYSTEM

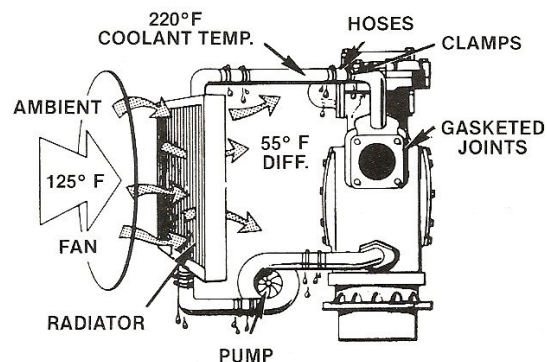
In the air-cooled design, the cooling air is forced directly to the cooling fins of the cylinders by two engine driven cooling fans. The engine heat is dissipated directly into the air and not through the water jacket as required by liquid cooling systems. This permits a higher differential between the cooling air and the metal temperatures than is permissible in water-cooled engines. Thus, a higher performance output is possible from each cylinder.

Air cooling is provided by two engine driven fans mounted in the center of the engine Vee. These fans are used to provide total cooling for the cylinders, engine and transmission oil and also to provide ventilation of the engine compartment. The air-cooled engine design permits the transmission and engine oil coolers to be mounted on the exterior of the engine. This design reduces power pack installation area and adds additional fuel storage space. It also permits easier disconnect and removal.

## AIR-COOLED 335°F DIFFERENTIAL



## LIQUID COOLED 95°F DIFFERENTIAL



NOTE: ENGINE OIL COOLING ON EITHER AIR OR LIQUID COOLED ENGINES ARE ESSENTIALLY EQUIVALENT.

*Liquid cooled engines require a double-heat exchange process. In this process, heat is transferred to the coolant flowing through the engine cylinder jackets. To support this process, the installation and use of water pumps, plumbing, hoses, clamps and gasketed joints is required to carry the coolant to the radiator for dissipation into the air. The temperature limitations of antifreeze and water also restrict the differential between coolant temperature and air. This restraint seriously limits the output of liquid cooled engines.*

# MODULAR CONSTRUCTION

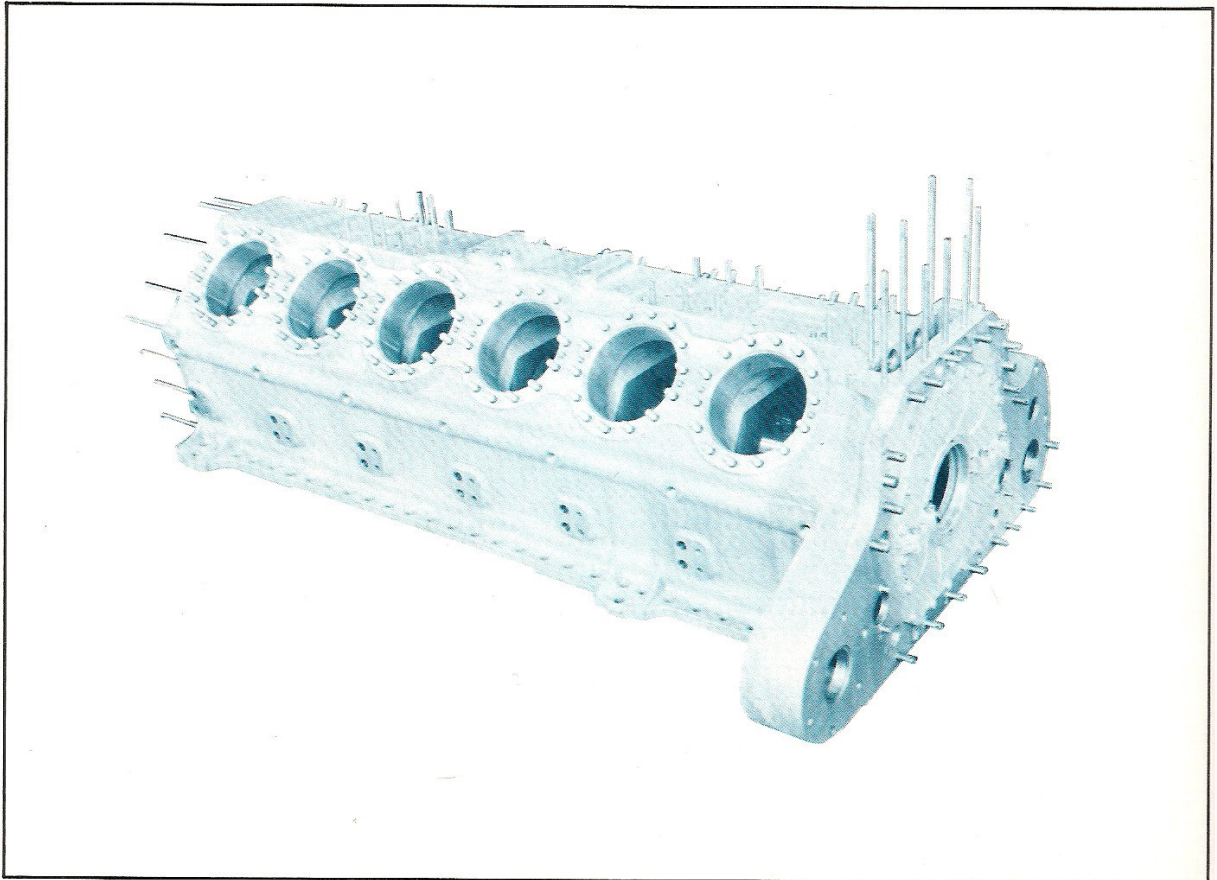
Modular construction is a major design feature of all 1790 Series diesel engines. It permits the use of weight saving aluminum components throughout the engine. These aluminum components facilitate cooling, provide a high power-to-weight ratio and easy accessibility to engine parts.

The one-piece cast aluminum crankcase is ribbed and reinforced at points of greatest stress for maximum durability.

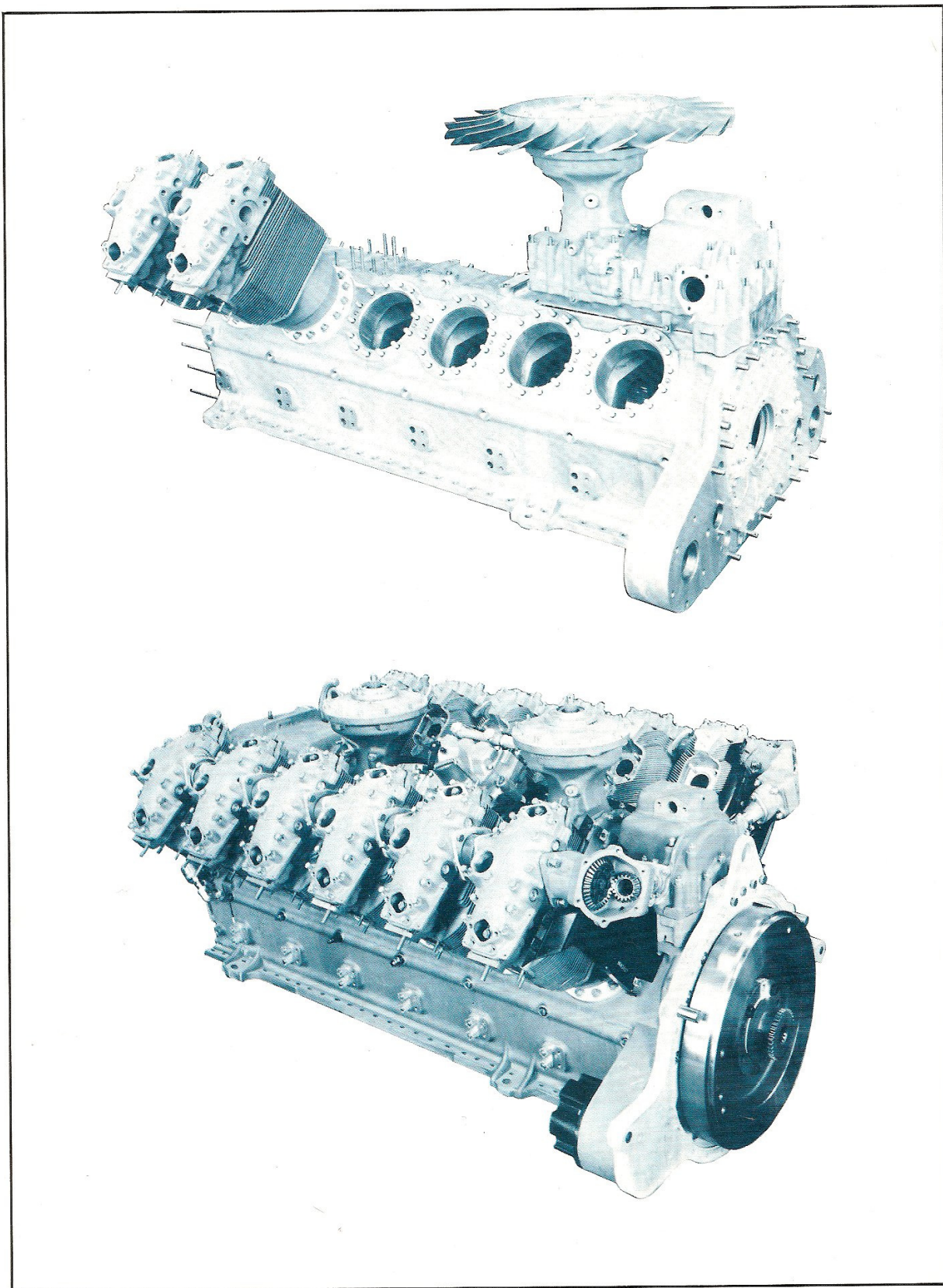
The cylinders are arranged in two banks with each containing six individually mounted Unisteel Cylinder assemblies. This arrangement provides for easy replacement and minimum teardown.

Two engine driven fans are mounted in the center Vee of the engine. They provide air cooling of the engine and lubrication system. This unique air cooling design eliminates engine bulk, water jacket requirements and the inherent problems of conventional liquid cooling systems.

Modular construction also permits easy access to engine assemblies requiring routine maintenance. The ninety-degree Vee engine design provides for easy accessibility to cooling fans, fuel injection system, turbocharger, fuel and oil filter assemblies.







# PRODUCT IMPROVEMENT PROGRAM

In 1972, Teledyne Continental Motors General Products Division embarked on an ambitious program for the product improvement of the AVDS-1790-2A Series engine. This program was designed to upgrade and improve the reliability of the engine.

This new product improved engine is frequently referred to as the RISE engine. It was developed as part of the U.S. Army's Reliability Improvement of Selected Equipment (RISE) Program. All major component parts were improved with the basic engine and horsepower remaining the same.

Two product improved engine models have evolved from the RISE Program. The AVDS-1790-2C Series engine features an oil cooled alternator and the AVDS-1790-2D Series engine is equipped with an air-cooled generator. Thus, the basic product improved engine is configured to service two different vehicle electrical systems.

In addition, the original AVDS-1790-2A engine can easily be converted to the new product improved engine by using an appropriate RISE Kit during overhaul. The U.S. Army has converted virtually all its operational tanks to the RISE engine configuration at depots located both in this country and overseas. The improved components of the RISE engine are:

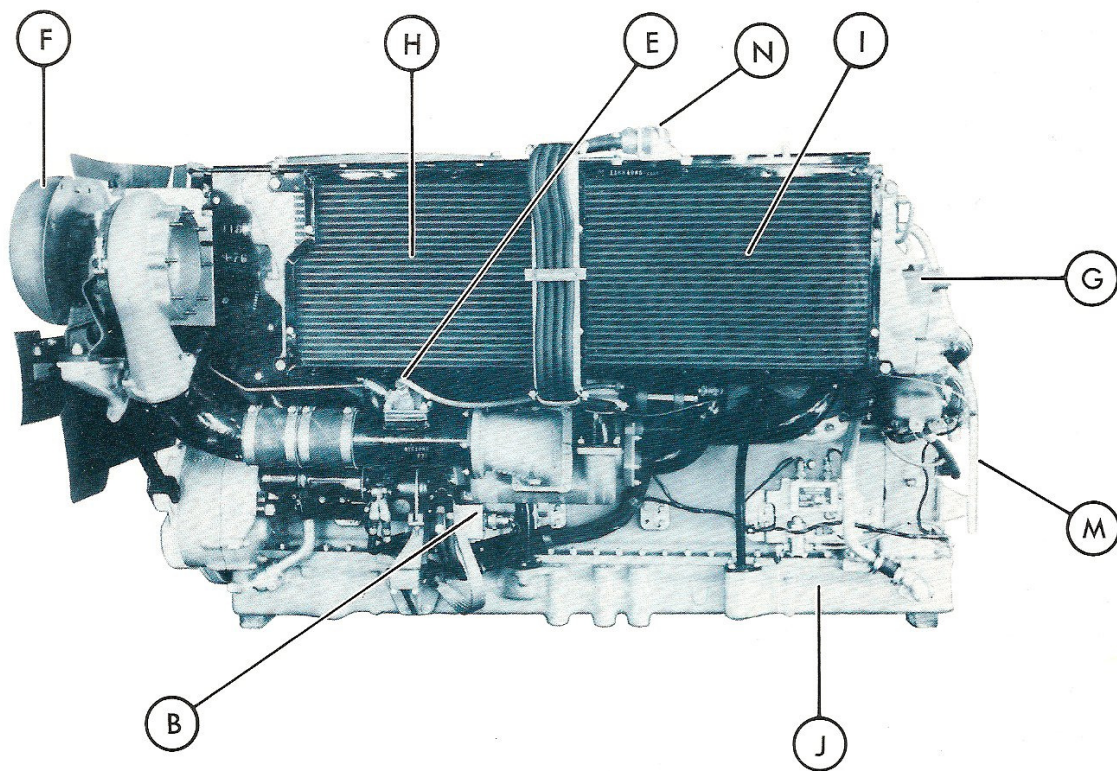
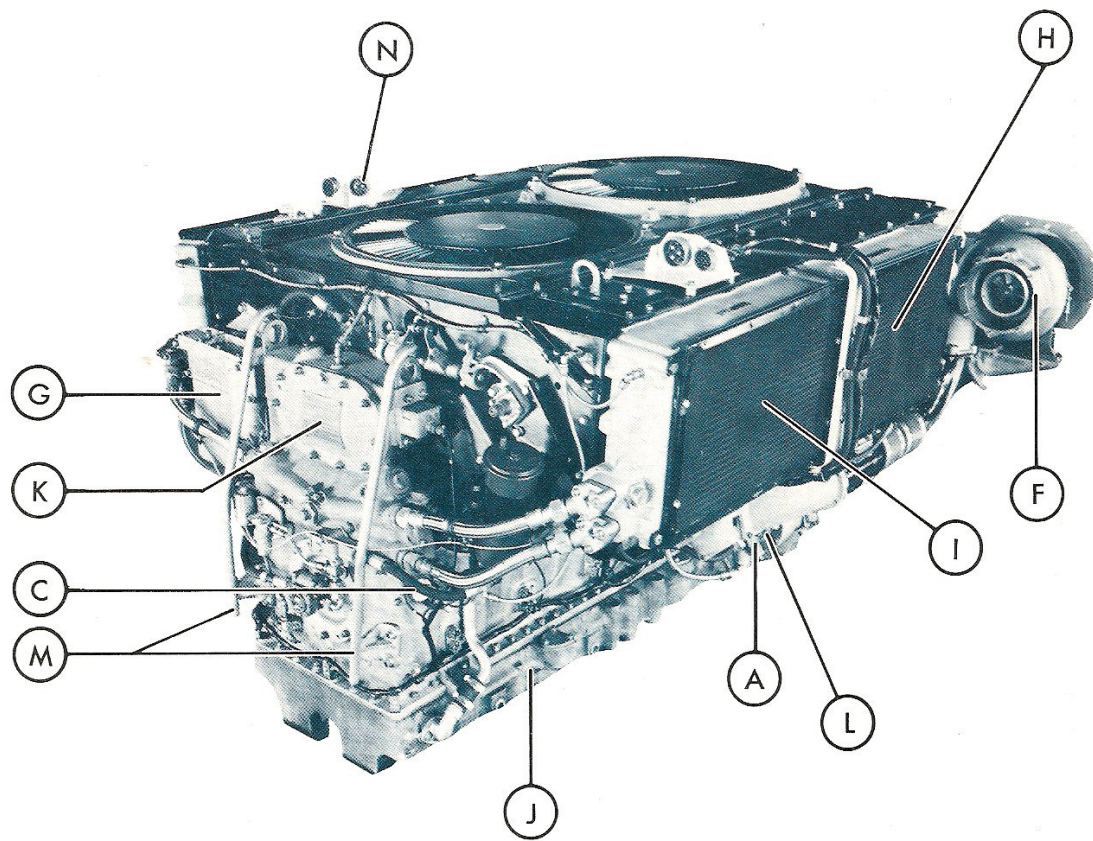
- A. *Generator Assembly and Drive*
- B. *Starter Low Voltage Protection*
- C. *Oil Pressure Switch and Temperature Transmitters*
- D. *Exhaust Manifold*
- E. *Manifold Flame Heater System*
- F. *Turbosupercharger*
- G. *Fuel Filter System and Automatic Water Drain*
- H. *Transmission Oil Cooler*

- I. *Engine Oil Cooler*
- J. *Oil Pan and Oil Pump*
- K. *Damper Housing and Oil Filter System*
- L. *Oil Cooled Alternator*
- M. *Front Protective Guard*
- N. *Top-Side Electrical Quick Disconnects*

## INTERNAL IMPROVEMENTS

- *Fuel Injection System*
- *Cylinders*
- *Pistons and Rings*
- *Piston Cooling Jets*
- *Oil Filter Elements*
- *Piston Rings*

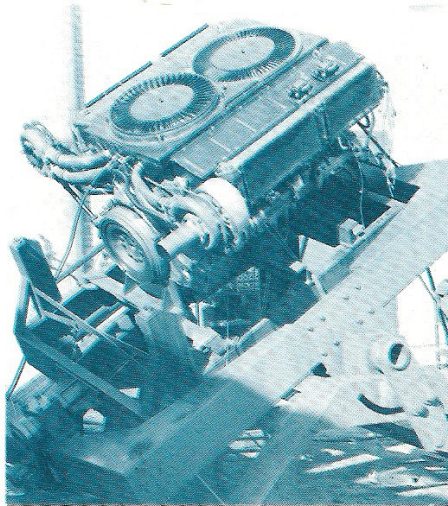




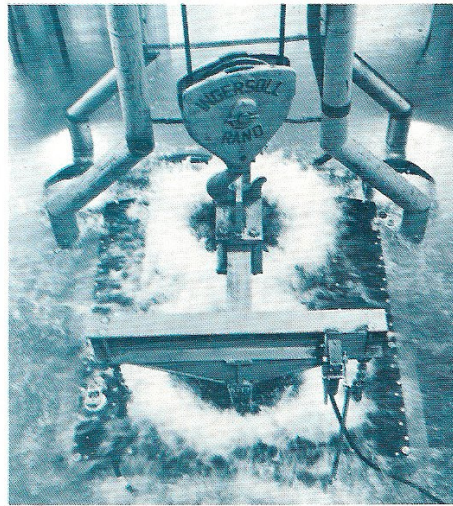


# PERFORMANCE

All Teledyne Continental Motors General Products Division engines are designed and manufactured to meet rigorous U.S. Government specifications. The engines are carefully assembled by skilled craftsmen and are performance tested to ensure dependable operation in all types of extreme temperatures.



*Tilt testing of engines is conducted to ascertain that all operational performance design limits are achieved. The tests are designed to simulate side-slope operation of up to forty percent and up to sixty percent for fore and aft tilt positions.*

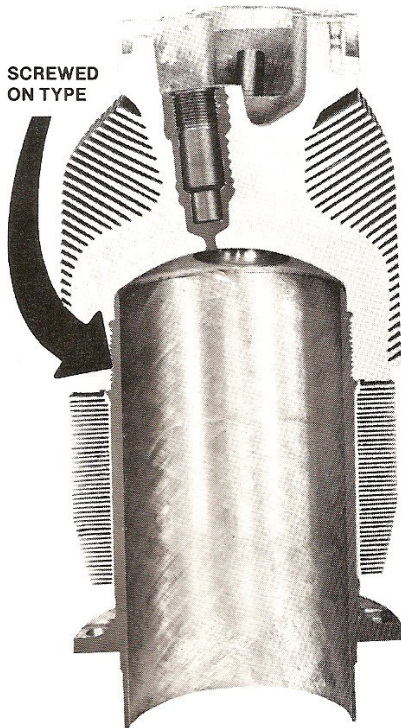


*The submersion test is used to functional test production engines while submerged underwater. Test procedures include the starting, stopping and operation of the power-plant while it is in a simulated "fording" environment.*

TEMPERATURE	+125°F (HOT) -25°F (COLD, WITHOUT AIDS) -65°F (COLD, WITH AIDS)
SLOPE	60% (FORE AND AFT) 40% (LATITUDINAL)
SUBMERGENCE	UNDERWATER (WITH SNORKEL FOR INDUCTION AIR)
ALTITUDE	8,000 FT. (AT NOT LESS THAN 75% OF RATED POWER)



### OLD ALUMINUM CYLINDER



WELDED  
ON TYPE



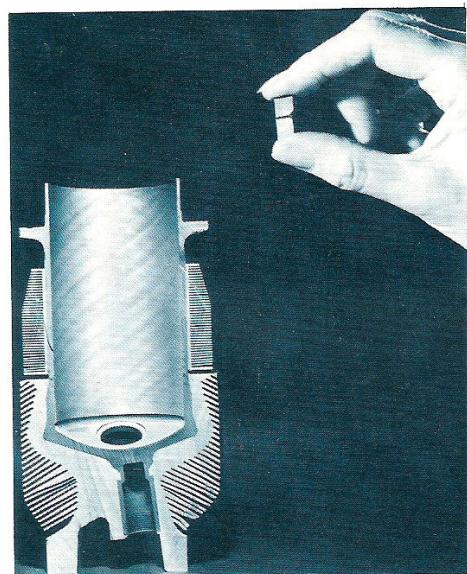
### NEW UNISTEEL CYLINDER

## The UNISTEEL Cylinder

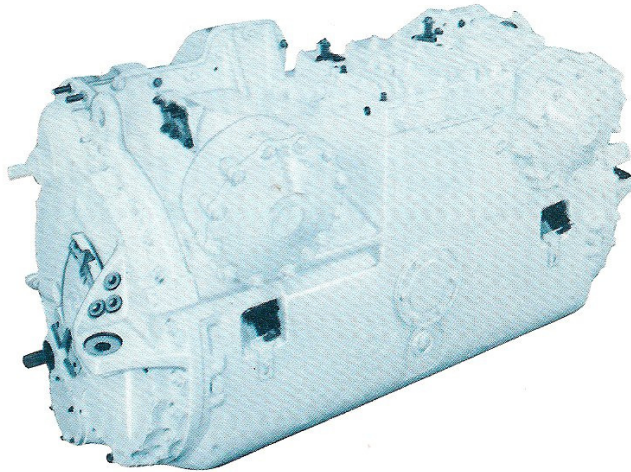
The Unisteel Cylinder was developed under the Reliability Improvement Selected Equipment (RISE) Program for the AVDS-1790-2C Series diesel engine.

The Unisteel Cylinder is composed of an all-steel cylinder barrel and head structure with an aluminum muff and cooling fins cast to the exterior of the two parts. These two cylinder pieces are then welded together by the Electron-Beam Welding technique. The Unisteel Cylinder is designed to carry the combustion pressure and thermal loads.

*Sample of the Electron-Beam Welding "bead" is photographically enlarged showing the technique used to join the cylinder barrel and head assemblies of the Unisteel Cylinder.*



# MODEL CD-850-6A TRANSMISSION



The Allison Model CD-850-6A transmission is a cross-drive design. It delivers power to both the right and left sprocket drive shafts. Engine oil is used in the transmission. It has triple differential steering with full pivot steer in neutral. It has two speeds forward and one reverse. The transmission is hydro-mechanically controlled with mechanically linked operator controls. It has three-point suspension. A power takeoff is provided through an internal spline. The CD-850-6A transmission and the AVDS-1790 Series diesel engine are used exclusively to power the U.S. Army's M60 Main Battle Tank.

## SPECIFICATIONS

### INPUT

Maximum Engine Power ..... 650 HP  
Maximum Engine Torque ..... 1685 FT/LBS  
Maximum Engine Speed ..... 2400 RPM

**TORQUE CONVERTER, TYPE** .... Single Stage, Multi-Phase  
Maximum Torque Multiplication ..... 3.6:1

**RANGES** ..... Two Forward, One Reverse

**RANGE CONTROL** ..... Manual

### GEAR RATIOS

Engine-to-Converter Step-up ..... 0.86:1  
Low Range ..... 3.50:1  
High Range ..... 1.26:1  
Reverse Range ..... 4.90:1

**TOTAL RATIO COVERAGE** ..... 10:1

**STEERING** ..... Triple Differential  
Regenerative Pivot Steering Neutral  
Turning Radius ..... Pivot to Infinity  
Steering Control ..... Mechanical

**BRAKES** ..... Multiple Wet Plate, Service & Parking

### WEIGHT

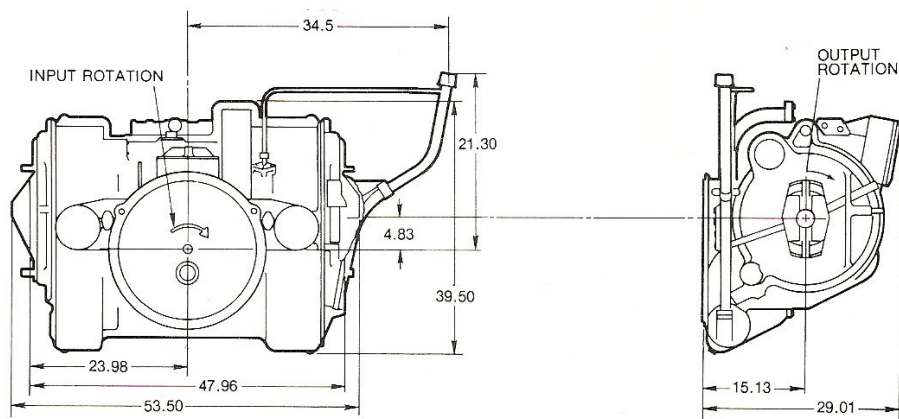
Dry ..... 3025 LBS

**OIL FILL** ..... 23 Gals.

### SHIFT AND STEER CONTROL

External ..... Mechanical  
Internal ..... Hydraulic

## INSTALLATION DIMENSIONS (Inches)





# RENK MODEL RK-304 TRANSMISSION

The RENK RK-304 is a hydro-mechanical power shift transmission with integrated reversing and steering unit for medium and heavy tracked vehicles with a gross engine power rating up to 1200 HP. The transmission can be attached to the engine directly or via an intermediate structure. The torque converter, which is directly coupled to the engine crankshaft, also serves as the engine flywheel.

The service and parking brakes are arranged on the transmission output shafts, which are positioned transversely to the input. The connection to the output shafts can be made via disconnectable gear-type couplings or via universal joints. Two mounting points are provided on the transmission for a three-point support of the power pack.

## SPECIFICATIONS

### INPUT

Maximum Engine Power ..... 1200 HP  
Maximum Engine Torque ..... 2434 FT/LBS  
Engine Speed ..... 2600 RPM

### TORQUE CONVERTER

Two Stage Turbine with Lock-Up Torque Ratio ... 2.4 to 2.7

### POWER-SHIFT UNIT

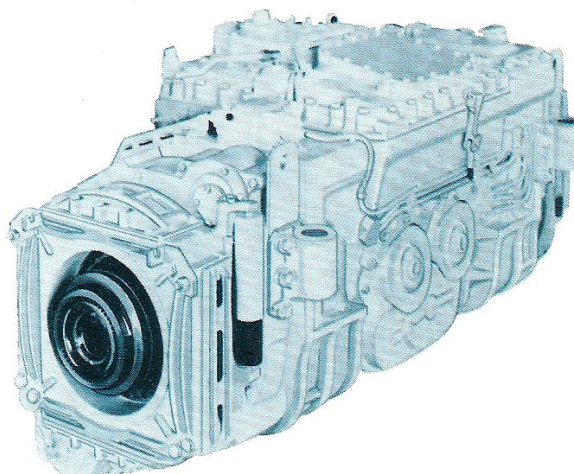
Planetary Transmission

### GEAR RATIOS

	Forward	Reverse
1st Gear	4.52	4.52
2nd Gear	2.20	2.20
3rd Gear	1.47	Blocked
4th Gear	0.95	Blocked

### STEERING

Geared Steer with Two Defined Radii for each Gear Range  
Stabilized to Ensure Equal Small Radius  $\pm 185$  RPM  
Speeds Straight Ahead Large Radius  $\pm 60$  RPM



### BRAKES

Disc Brakes-Both Hydraulically  
and Mechanically Applied ..... 8851 FT/LBS

### RETARDER

Maximum Braking Power ..... 300 HP

### AUXILIARY DRIVE

Output ..... 150 HP  
Speed Ratio ..... 3:1 Step Up

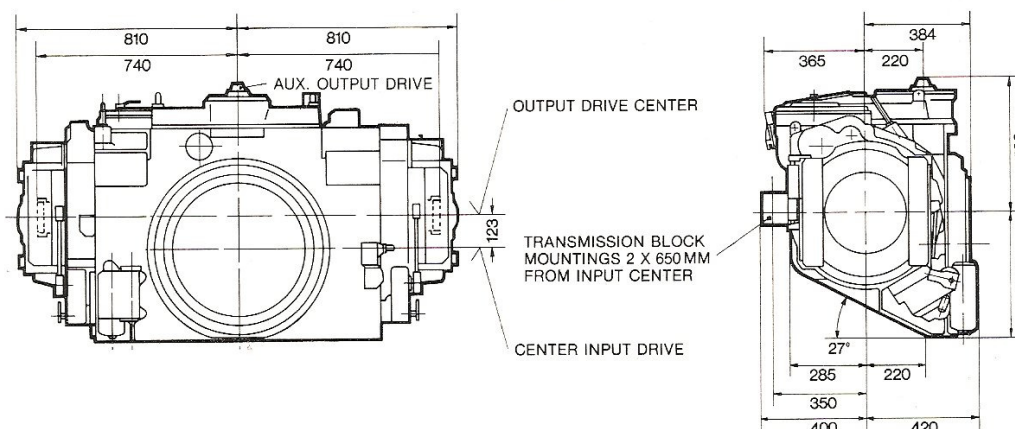
### WEIGHT

Dry ..... 3850 LBS

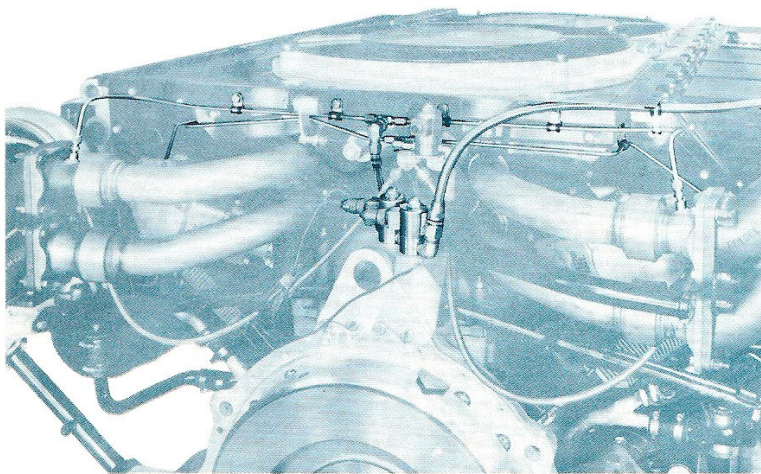
OIL FILL ..... 24 Gals.

CONTROL VOLTAGE ..... 24-28 Volts

## INSTALLATION DIMENSIONS (MM)



# SMOKE GENERATOR SYSTEM FOR TRACKED VEHICLES



## PRIMARY FEATURES

- DESIGNED FOR DIESEL ENGINES
- USES MILITARY OFF-THE-SHELF COMPONENTS
- ADAPTABLE TO ALL TRACKED DIESEL VEHICLES
- EASILY RETROFITTED
- FAIL SAFE
- PERMANENT INSTALLATION

## • SMOKE GENERATOR FOR TRACKED VEHICLES

The Diesel Smoke Generator System is designed to reduce the effectiveness of enemy antitank weapons systems and protect our tanks from long-range visual observation.

## • SIMPLICITY AND LOW COST

It is designed specifically for diesel engines, and can easily be adapted to all current military tracked diesel powered vehicles. Designed to use off-the-shelf components, the system is one of simplicity and low cost. It is an add-on type unit and is fail-safe in operation.

## • READILY INSTALLED

It is easy to install. Special design features allow field modifications and depot retrofits to require less than 8-manhours for installation. Also, it is not necessary to remove either the power pack or the turret to install, or maintain the Diesel Smoke Generator System in the M60 Tank.

## • INCREASED SURVIVABILITY

In terms of tank warfare at the lowest unit or vehicle levels, the Diesel Smoke Generator System used in conjunction with the M239 Grenade System, will increase the survivability of our tank and mechanized forces.

## • COST EFFECTIVE

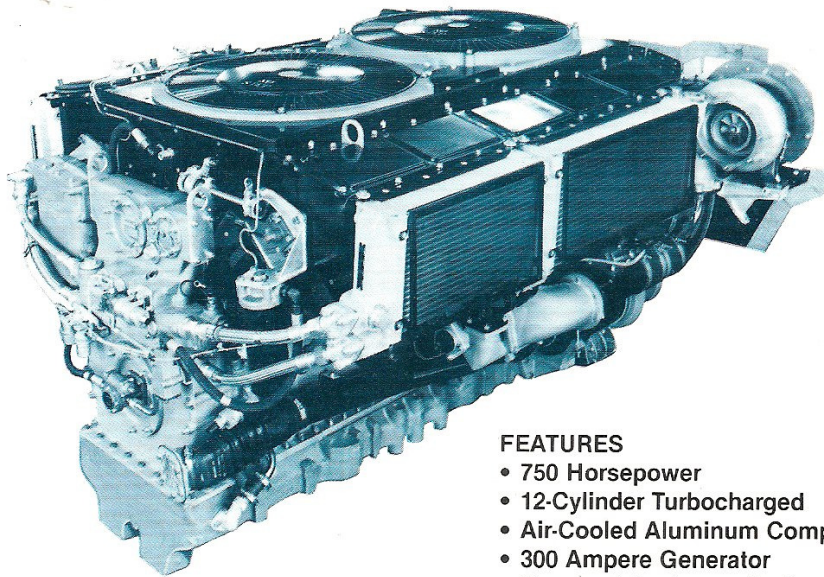
The system is cost effective. It is dependable and simple to operate and maintain. These outstanding features are unmatched by current technology. Teledyne Continental Motors General Products Division has aggressively responded to the demands of battlefield commanders for a new dependable countermeasures weapons system.

## • CONTINUOUSLY ON-LINE

Since the Diesel Smoke Generator System is permanently mounted on the vehicle's engine and uses standard diesel fuel to create smoke, the system is always available to produce smoke any time the engine is running. Smoke can be produced by the simple flick of a toggle switch.



# Model AVDS-1790-2AC Series Diesel Engine



## FEATURES

- 750 Horsepower
- 12-Cylinder Turbocharged
- Air-Cooled Aluminum Components
- 300 Ampere Generator
- Compact Design — Reduced Width
- High Power-to-Weight Ratio

## DESCRIPTION

The Continental AVDS-1790-2AC Series engine is a special model of the AVDS-1790-2A Series engine configured for use in the Centurion Tank. It is an air-cooled, 90° upright Vee design, 12-cylinder turbocharged diesel engine, rated at 750 gross horsepower at 2400 rpm. Air cooling is provided by two engine-driven fans, producing an airflow of 20,000 cfm at 2400 engine rpm. Extensive use of aluminum components throughout the engine provides a high power-to-weight ratio.

The compact design of the AVDS-1790-2AC engine includes individual and easily replaceable cylinders. Overhead valves are used, with an overhead camshaft in each cylinder bank. For rapid service, all scheduled maintenance items are easily accessible from the top of the

engine. Air cooling eliminates the maintenance burden of liquid cooling systems.

The AVDS-1790-2AC Series engine is capable of starting and operating at temperatures from -25° to +125°F (-65° with starting aids). It will also operate while totally submerged in water, with the aid of an intake snorkel.

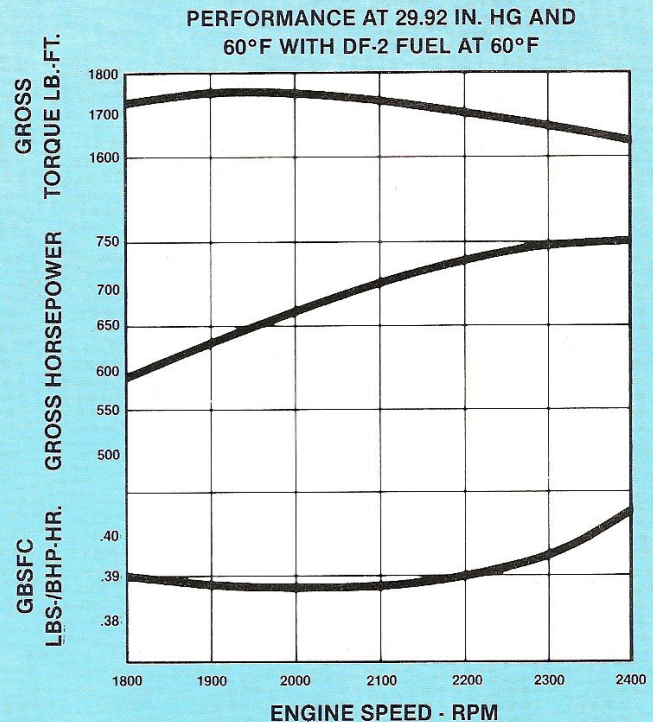
The AVDS-1790-2AC is extensively used to convert the Centurion Tank from gasoline to diesel power. Many of these engines have been successfully retrofitted into the Centurion Tank. The AVDS-1790-2A Series engines have been produced for the use in the U.S. Army M60 Tank, AVLB Bridge Launcher, M728 Combat Engineer Vehicle and to convert M47 and M48 tanks from gasoline to diesel power.



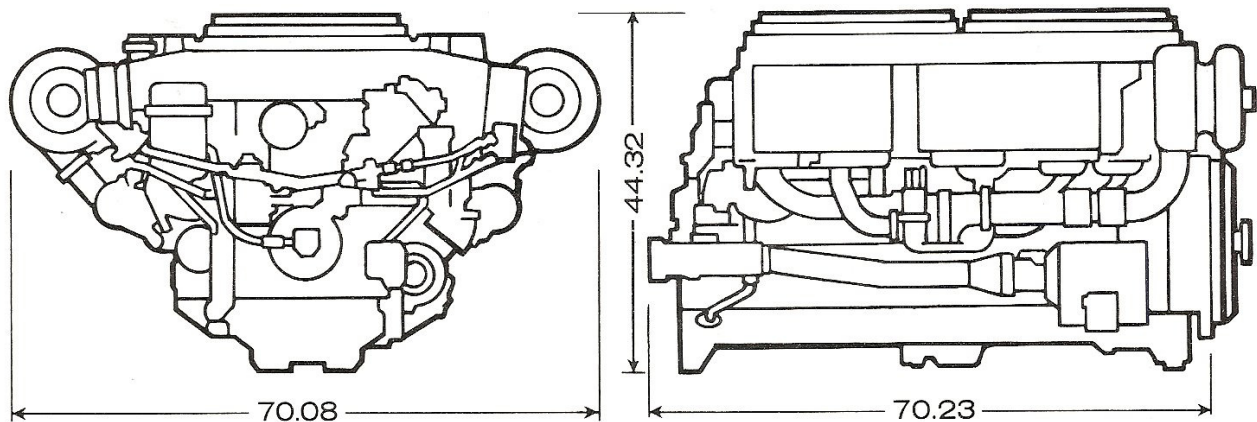
# SPECIFICATIONS

## PERFORMANCE

Displacement .....1790 cu.in.  
 Weight: Lbs. dry (with accessories).....4700  
 Horsepower, gross (at rated rpm) .....750  
 Horsepower, net (at rated rpm) .....642  
 Speed:  
     Governed (full load) .....2400 rpm  
     Governed (no load) .....2640 rpm  
     Low Idle .....700 rpm  
 Cylinders: Number .....12  
     Arrangement .....90 degree, V.  
     Bore .....5.75 inch  
     Stroke .....5.75 inch  
     Compression ratio .....16:1  
 Camshafts: Number .....2  
     Arrangement .....Overhead  
 Ignition: .....Compression  
 Air System: Induction Turbocharged  
     Airflow (at rated power  
     and speed) .....2075 cfm  
 Fuel Type .....DF-A, DF-1, DF-2  
 Fuel Consumption: At (2400 rpm).....296 lbs/hr  
 Lubrication: Capacity for dry engine .....21 gal.  
     Capacity for oil change .....18 gal.  
 Normal oil temperature .....180°F at 60°F Ambient  
 Maximum oil temperature .....260°F at 115°F Ambient

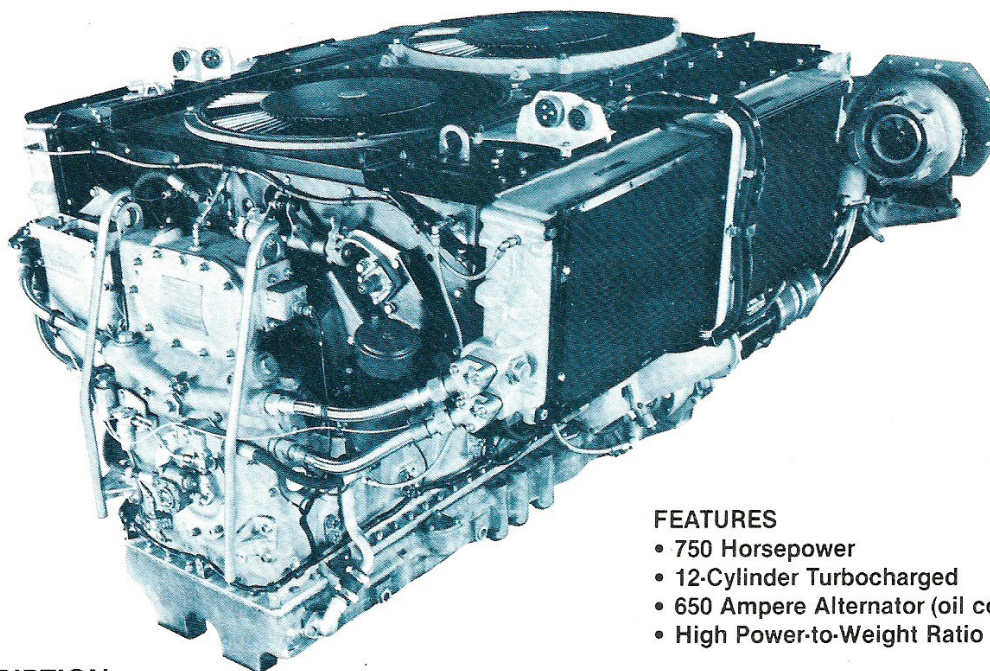


## AVDS-1790-2AC SERIES ENGINE INSTALLATION DIMENSIONS





# Model AVDS-1790-2C Series Diesel Engine



## FEATURES

- 750 Horsepower
- 12-Cylinder Turbocharged
- 650 Ampere Alternator (oil cooled)
- High Power-to-Weight Ratio

## DESCRIPTION

The Continental AVDS-1790-2C Series engine is an air-cooled, 90° upright Vee design, 12-cylinder turbocharged diesel engine—rated at 750 gross horsepower at 2400 rpm. Air cooling for engine cylinders, as well as engine and transmission oil, is provided by two engine driven fans mounted in the center of the Vee. Extensive use of aluminum components throughout the engine provides a high power-to-weight ratio.

The compact design of the AVDS-1790-2C engine includes individual and easily replaceable cylinders. Overhead valves are used with an overhead camshaft in each cylinder bank. All scheduled maintenance items are easily

accessible from the top of the engine to facilitate rapid service. Air cooling eliminates the maintenance burden of liquid cooling systems.

The engine is capable of starting and operating at temperatures from  $-25^{\circ}$  to  $+125^{\circ}\text{F}$  ( $-65^{\circ}$  with starting aids). It will also operate while totally submerged in water, with the aid of an intake snorkel.

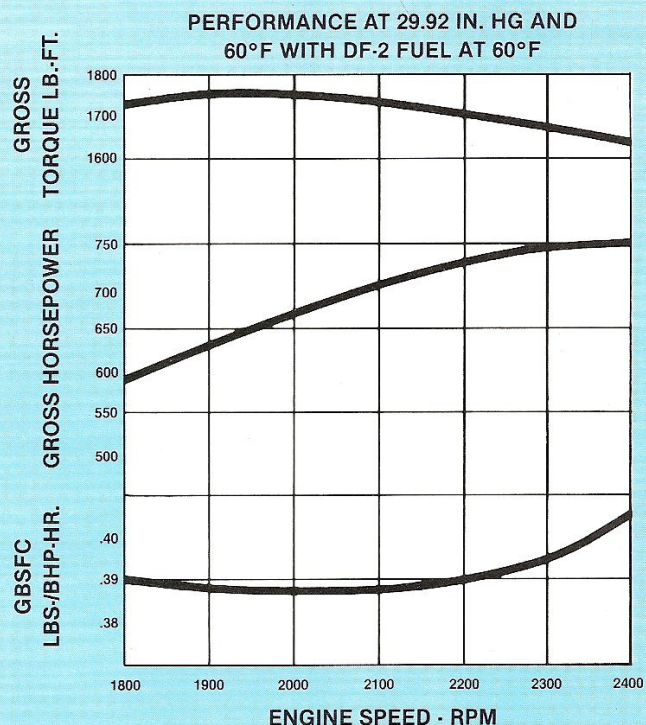
The AVDS-1790-2C Series engine is an improved version of the Continental AVDS-1790-2A Series diesel engine. It is specifically designed to accept an oil cooled 28V alternator—rated at 650 amps.



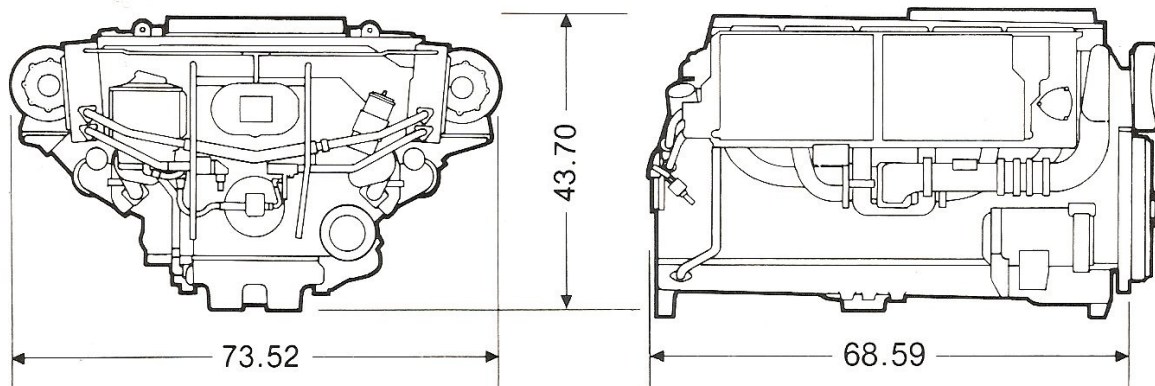
# SPECIFICATIONS

## PERFORMANCE

Displacement ..... 1790 cu.in.  
 Weight: Lbs. dry (with accessories) ..... 4900  
 Horsepower, gross (at rated rpm) ..... 750  
 Horsepower, net (at rated rpm) ..... 642  
 Speed:  
     Governed (full load) ..... 2400 rpm  
     Governed (no load) ..... 2640 rpm  
     Low Idle ..... 700 rpm  
 Cylinders: Number ..... 12  
     Arrangement ..... 90 degree, V.  
     Bore ..... 5.75 inch  
     Stroke ..... 5.75 inch  
     Compression ratio ..... 16:1  
 Camshafts: Number ..... 2  
     Arrangement ..... Overhead  
 Ignition: ..... Compression  
 Air System: Induction Turbocharged  
     Airflow (at rated power  
     and speed) ..... 2075 cfm  
 Fuel Type ..... DF-A, DF-1, DF-2  
 Fuel Consumption: At (2400 rpm) ..... 296 lbs/hr  
 Lubrication: Capacity for dry engine ..... 21 gal.  
     Capacity for oil change ..... 18 gal.  
 Normal oil temperature ..... 180°F at 60°F Ambient  
 Maximum oil temperature ..... 260°F at 115°F Ambient

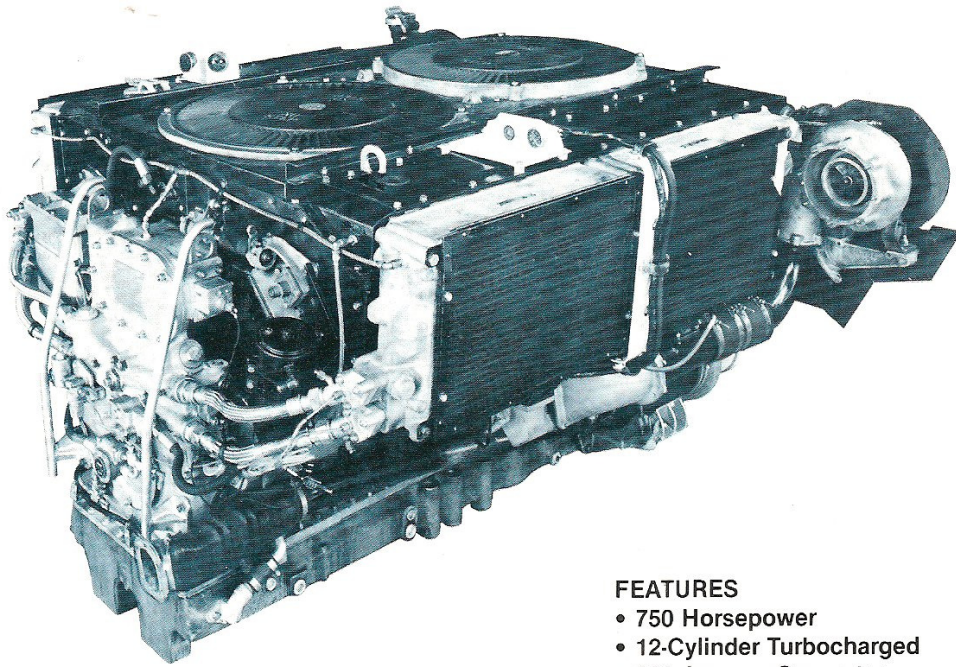


## AVDS-1790-2C SERIES ENGINE INSTALLATION DIMENSIONS





# Model AVDS-1790-2D Series Diesel Engine



## FEATURES

- 750 Horsepower
- 12-Cylinder Turbocharged
- 300 Ampere Generator
- High Power-to-Weight Ratio

## DESCRIPTION

The Continental AVDS-1790-2D Series engine is an air-cooled, 90° upright Vee design, 12-cylinder turbocharged diesel engine — rated at 750 gross horsepower at 2400 rpm. Air cooling for engine cylinders, as well as engine and transmission oil, is provided by two engine driven fans mounted in the center of the Vee. Extensive use of aluminum components throughout the engine provides a high power-to-weight ratio.

The compact design of the AVDS-1790-2D engine includes individual and easily replaceable cylinders. Overhead valves are used with an overhead camshaft in each cylinder bank. All scheduled maintenance items are easily acces-

sible from the top of the engine to facilitate rapid service. Air cooling eliminates the maintenance burden of liquid cooling systems.

The engine is capable of starting and operating at temperatures from -25° to +125°F (-65° with starting aids). It will also operate while totally submerged in water, with the aid of an intake snorkel.

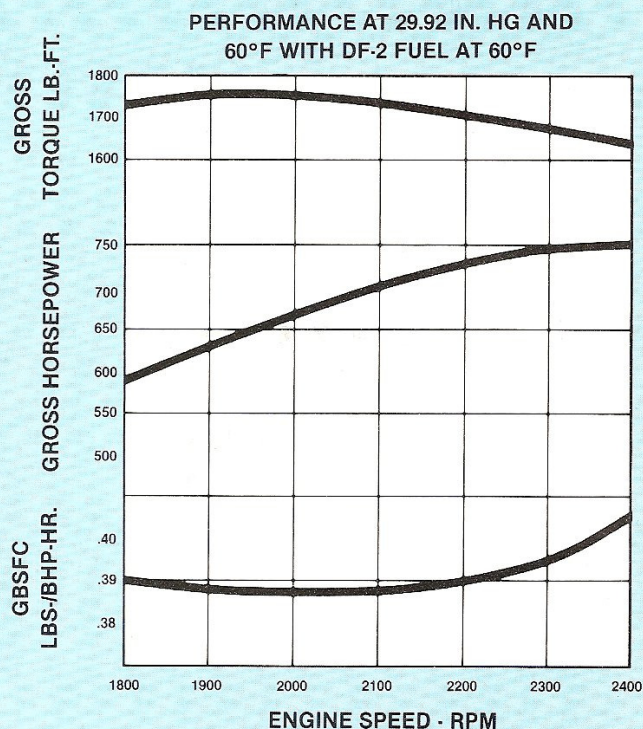
The AVDS-1790-2D Series engine is an improved version of the Continental AVDS-1790-2A Series diesel engine. It is specifically designed to accept an air-cooled generator — rated at 300 amps.



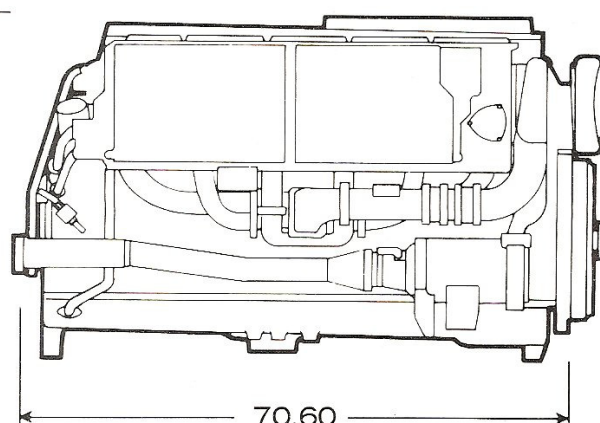
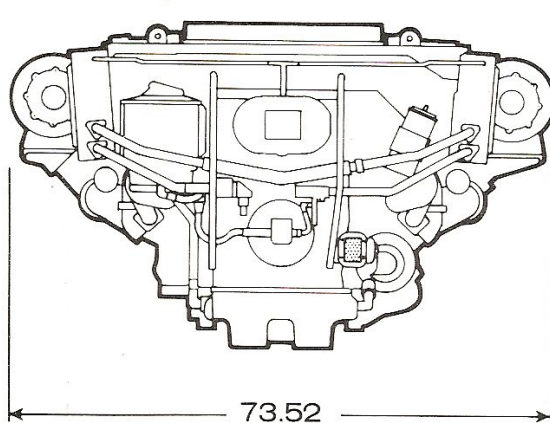
# SPECIFICATIONS

## PERFORMANCE

Displacement ..... 1790 cu. in.  
 Weight: Lbs. dry (with accessories) ..... 4880  
 Horsepower, gross (at rated rpm) ..... 750  
 Horsepower, net (at rated rpm) ..... 642  
 Speed: Governed (full load) ..... 2400 rpm  
           Governed (no load) ..... 2640 rpm  
           Low Idle ..... 700 rpm  
 Cylinders: Number ..... 12  
           Arrangement ..... 90 degree, V.  
           Bore ..... 5.75 inch  
           Stroke ..... 5.75 inch  
           Compression ratio ..... 16:1  
 Camshafts: Number ..... 2  
           Arrangement ..... Overhead  
 Ignition: ..... Compression  
 Generator: ..... 28VDC, 300 amps  
 Air System: Induction Turbocharged  
           Airflow (at rated power  
           and speed) ..... 2075 cfm  
 Fuel Type ..... DF-A, DF-1, DF-2  
 Fuel Consumption: At (2400 rpm) ..... 296 lbs/hr  
 Lubrication: Capacity for dry engine ..... 21 gal.  
           Capacity for oil change ..... 18 gal.  
 Normal oil temperature ..... 180°F at 60°F Ambient  
 Maximum oil temperature ..... 260°F at 115°F Ambient

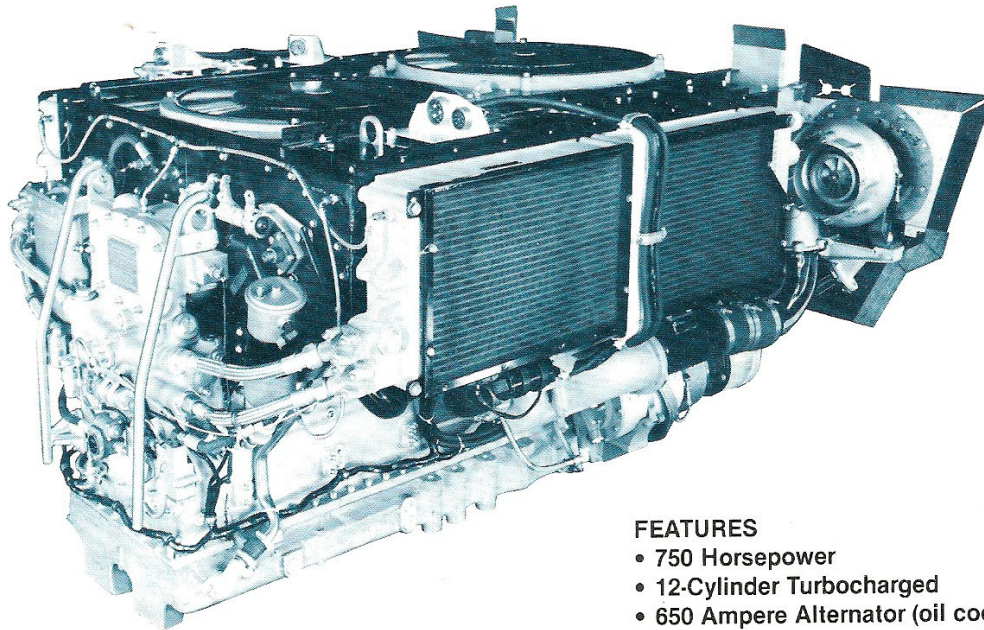


## AVDS-1790-2D SERIES ENGINE INSTALLATION DIMENSIONS





# Model AVDS-1790-2CC Series Diesel Engine



## DESCRIPTION

The Continental AVDS-1790-2CC Series engine is an air-cooled, 90° upright Vee design, 12-cylinder turbocharged diesel engine—rated at 750 gross horsepower at 2400 rpm. Air cooling for engine cylinders, as well as engine and transmission oil, is provided by two engine driven fans mounted in the center of the Vee. Extensive use of aluminum components throughout the engine provides a high power-to-weight ratio.

The compact design of the AVDS-1790-2CC engine includes individual and easily replaceable cylinders. Overhead valves are used with an overhead camshaft in each cylinder bank. All scheduled maintenance items are easily accessible from the top of the engine to facilitate rapid service. Air cooling eliminates

## FEATURES

- 750 Horsepower
- 12-Cylinder Turbocharged
- 650 Ampere Alternator (oil cooled)
- Compact Design — Reduced Width
- High Power-to-Weight Ratio

the maintenance burden of liquid cooling systems.

The engine is capable of starting and operating at temperatures from  $-25^{\circ}$  to  $+125^{\circ}\text{F}$  ( $-65^{\circ}$  with starting aids). It will also operate while totally submerged in water, with the aid of an intake snorkel.

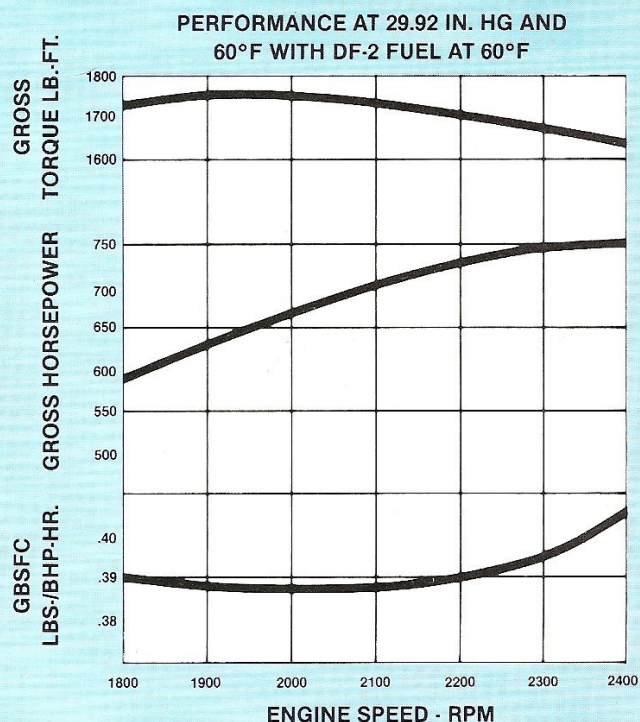
The AVDS-1790-2CC Series engine is an improved version of the Continental AVDS-1790-2AC Series diesel engine. It is specifically designed to accept an oil-cooled 28V alternator—rated at 650 amps. It is narrower in width than the AVDS-1790-2C engine and is designed to fit in the Centurion Tank in order to convert the tank from gasoline to diesel power.



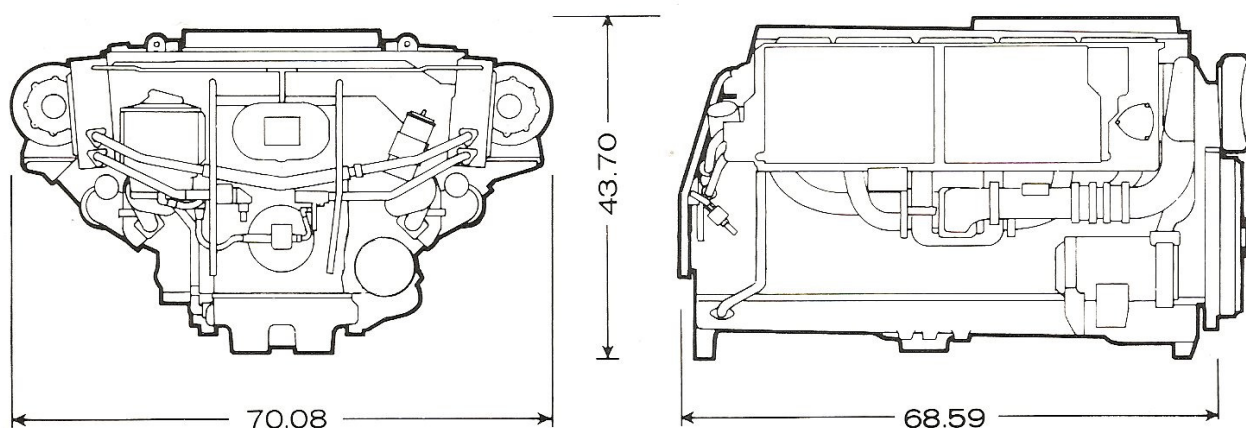
# SPECIFICATIONS

## PERFORMANCE

Displacement .....1790 cu.in.  
 Weight: Lbs. dry (with accessories).....4876  
 Horsepower, gross (at rated rpm) .....750  
 Horsepower, net (at rated rpm) .....642  
 Speed:  
     Governed (full load) .....2400 rpm  
     Governed (no load) .....2640 rpm  
     Low Idle .....700 rpm  
 Cylinders: Number .....12  
     Arrangement .....90 degree, V.  
     Bore .....5.75 inch  
     Stroke .....5.75 inch  
     Compression ratio .....16:1  
 Camshafts: Number .....2  
     Arrangement .....Overhead  
 Ignition: .....Compression  
 Air System: Induction Turbocharged  
     Airflow (at rated power  
     and speed) .....2075 cfm  
 Fuel Type .....DF-A, DF-1, DF-2  
 Fuel Consumption: At (2400 rpm).....296 lbs/hr  
 Lubrication: Capacity for dry engine .....21 gal.  
     Capacity for oil change .....18 gal.  
 Normal oil temperature .....180°F at 60°F Ambient  
 Maximum oil temperature .....260°F at 115°F Ambient

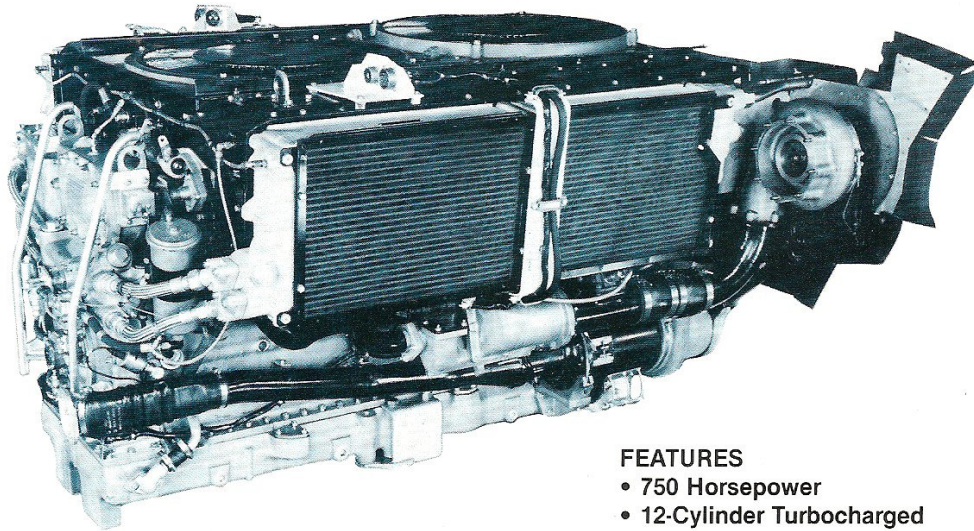


## AVDS-1790-2CC SERIES ENGINE INSTALLATION DIMENSIONS





# Model AVDS-1790-2DC Series Diesel Engine



## FEATURES

- 750 Horsepower
- 12-Cylinder Turbocharged
- 300 Ampere Generator
- Compact Design — Reduced Width
- High Power-to-Weight Ratio

## DESCRIPTION

The Continental AVDS-1790-2DC Series engine is an air-cooled, 90° upright Vee design, 12-cylinder turbocharged diesel engine—rated at 750 gross horsepower at 2400 rpm. Air cooling for engine cylinders, as well as engine and transmission oil, is provided by two engine driven fans mounted in the center of the Vee. Extensive use of aluminum components throughout the engine provides a high power-to-weight ratio.

The compact design of the AVDS-1790-2DC engine includes individual and easily replaceable cylinders. Overhead valves are used with an overhead camshaft in each cylinder bank. All scheduled maintenance items are easily accessible from the top of the engine to

facilitate rapid service. Air cooling eliminates the maintenance burden of liquid cooling systems.

The engine is capable of starting and operating at temperatures from  $-25^{\circ}$  to  $+125^{\circ}\text{F}$  ( $-65^{\circ}$  with starting aids). It will also operate while totally submerged in water, with the aid of an intake snorkel.

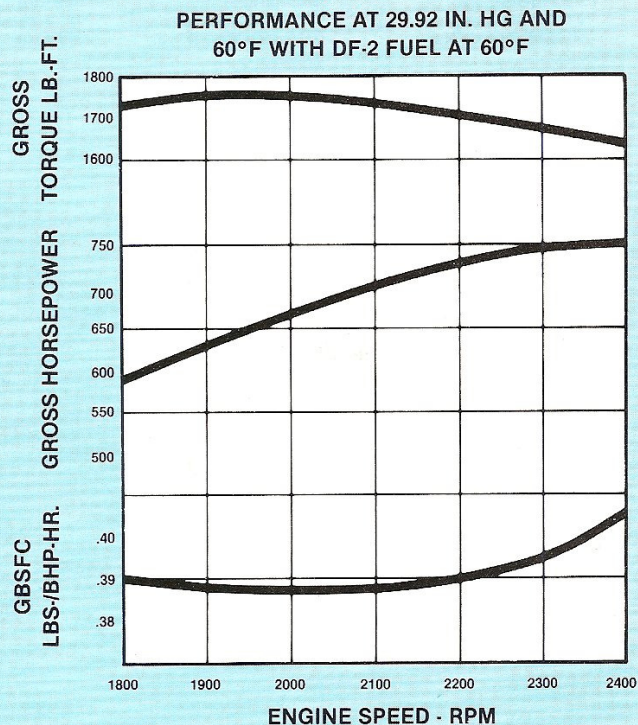
The AVDS-1790-2DC Series engine is an improved version of the Continental AVDS-1790-2AC Series diesel engine. It is specifically designed to accept an air-cooled generator—rated at 300 amps. It is narrower in width than the AVDS-1790-2C engine and is designed to fit in the Centurion Tank in order to convert the tank from gasoline to diesel power.



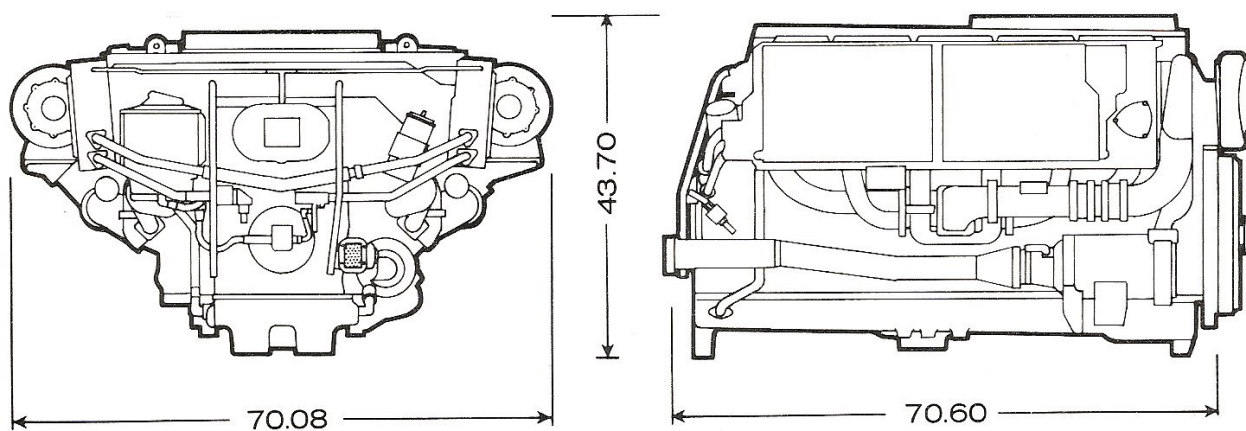
# SPECIFICATIONS

## PERFORMANCE

Displacement ..... 1790 cu.in.  
 Weight: Lbs. dry (with accessories) ..... 4880  
 Horsepower, gross (at rated rpm) ..... 750  
 Horsepower, net (at rated rpm) ..... 642  
 Speed:  
     Governed (full load) ..... 2400 rpm  
     Governed (no load) ..... 2640 rpm  
     Low Idle ..... 700 rpm  
 Cylinders: Number ..... 12  
     Arrangement ..... 90 degree, V.  
     Bore ..... 5.75 inch  
     Stroke ..... 5.75 inch  
     Compression ratio ..... 16:1  
 Camshafts: Number ..... 2  
     Arrangement ..... Overhead  
 Ignition: ..... Compression  
 Air System: Induction Turbocharged  
     Airflow (at rated power  
     and speed) ..... 2075 cfm  
 Fuel Type ..... DF-A, DF-1, DF-2  
 Fuel Consumption: At (2400 rpm) ..... 296 lbs/hr  
 Lubrication: Capacity for dry engine ..... 21 gal.  
     Capacity for oil change ..... 18 gal.  
 Normal oil temperature ..... 180°F at 60°F Ambient  
 Maximum oil temperature ..... 260°F at 115°F Ambient

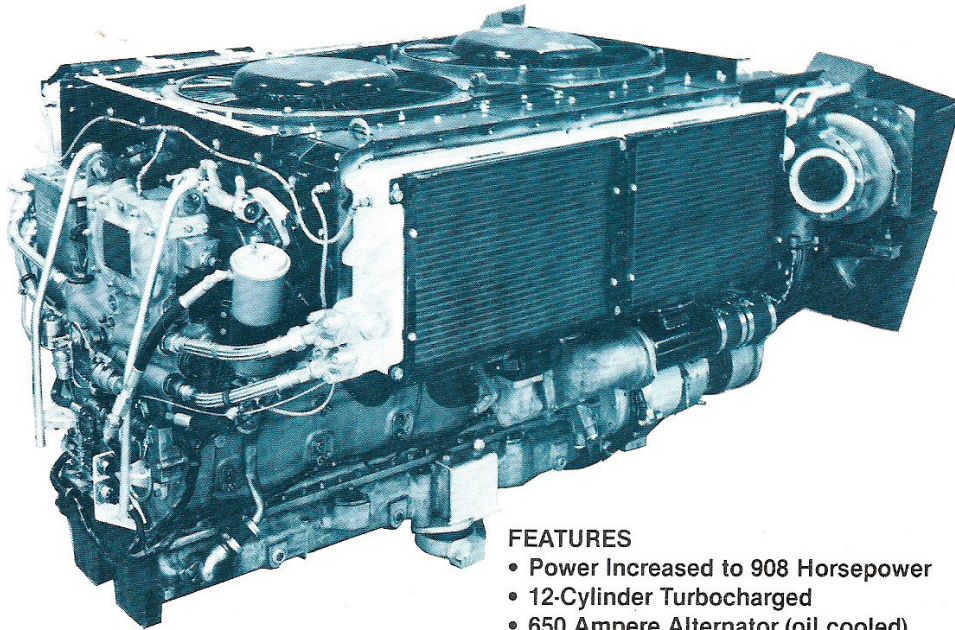


## AVDS-1790-2DC SERIES ENGINE INSTALLATION DIMENSIONS





# Model AVDS-1790-5A Series Diesel Engine



## FEATURES

- Power Increased to 908 Horsepower
- 12-Cylinder Turbocharged
- 650 Ampere Alternator (oil cooled)
- Compact Design — Reduced Width
- High Power-to-Weight Ratio

## DESCRIPTION

The Continental AVDS-1790-5A Series engine is an air-cooled 90° upright Vee design, 12-cylinder turbocharged diesel engine rated at 908 gross horsepower at 2400 rpm. Air cooling is provided by two engine-driven fans that provide the required cooling air for the engine cylinders, engine and transmission oil. Extensive use of aluminum components throughout the engine provides a high power-to-weight ratio.

The compact design of the AVDS-1790-5A engine includes individual and easily replaceable cylinders. Overhead valves are used with an overhead camshaft in each cylinder bank. For rapid service, all scheduled maintenance items are easily accessible from the top of the

engine. Air cooling eliminates the maintenance burden of liquid cooling systems.

The AVDS-1790-5A Series engine has been designed and developed for use in the combat environment. It is completely waterproof and can be totally submerged with only the addition of combustion snorkels. Cold starting has been simplified by the addition of an automatic intake flame heater. The cooling system has been designed for successful operation at ambient temperatures up to 125°F.

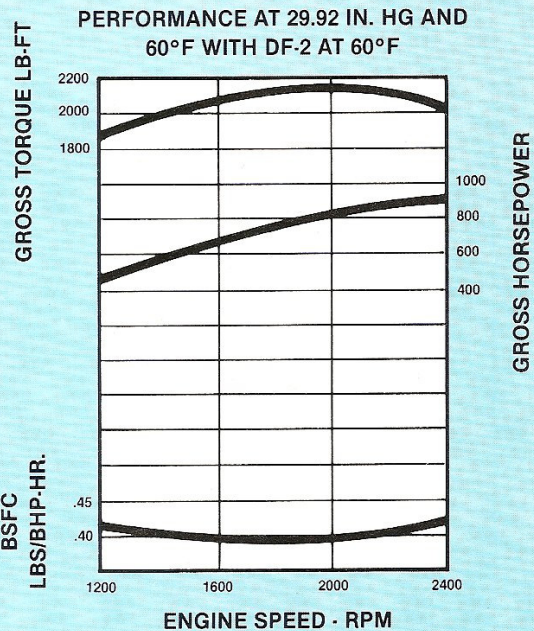
The AVDS-1790-5A Engine is an up powered version of the AVDS-1790-2C engine with over 80 percent commonality of parts between the two diesel powered engines.



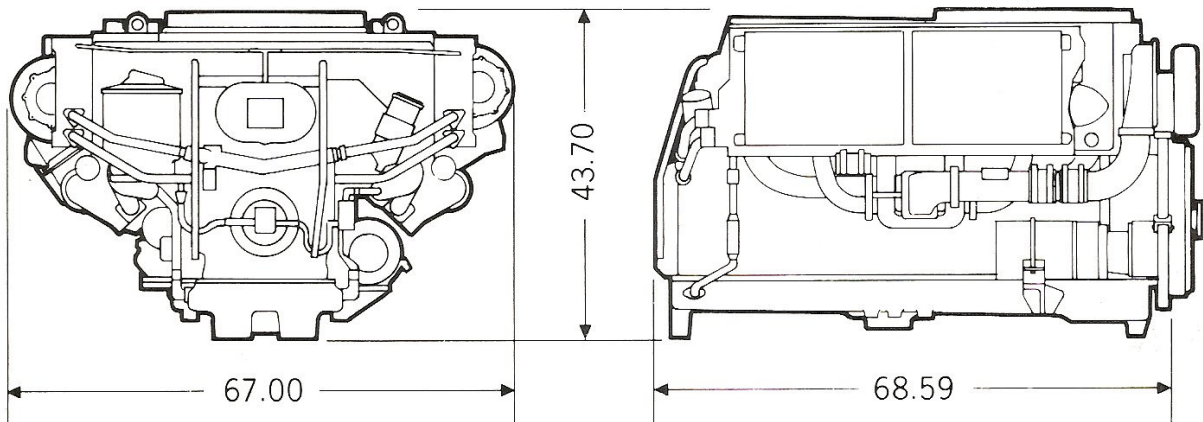
# SPECIFICATIONS

## PERFORMANCE

Displacement ..... 1790 cu.in.  
 Weight: Lbs. dry (with accessories) ..... 4900  
 Horsepower, gross (at 2400 rpm) ..... 908  
 Horsepower, Net (at 2400 rpm) ..... 775  
 Speed:     Governed (full load) ..... 2400 rpm  
              Governed (no load) ..... 2640 rpm  
              Low Idle ..... 700 rpm  
 Cylinders:   Number ..... 12  
               Arrangement ..... 90 degree, V.  
               Bore ..... 5.75 inch  
 Pistons:     Stroke ..... 5.75 inch  
               Compression ratio ..... 14.5:1  
 Camshafts:   Number ..... 2  
               Arrangement ..... Overhead  
 Ignition: ..... Compression  
 Air System: Induction Turbocharged  
               Airflow (at rated power  
               and speed) ..... 2200 cfm  
 Fuel Type ..... DF-A, DF-1, DF-2  
 Fuel Consumption: At (2400 rpm) ..... 380 lbs/hr  
 Lubrication: Capacity for dry engine ..... 21 gal.  
               Capacity for oil change ..... 18 gal.  
 Normal oil temperature ..... 180°F at 60°F Ambient  
 Maximum oil temperature ..... 260°F at 115°F Ambient

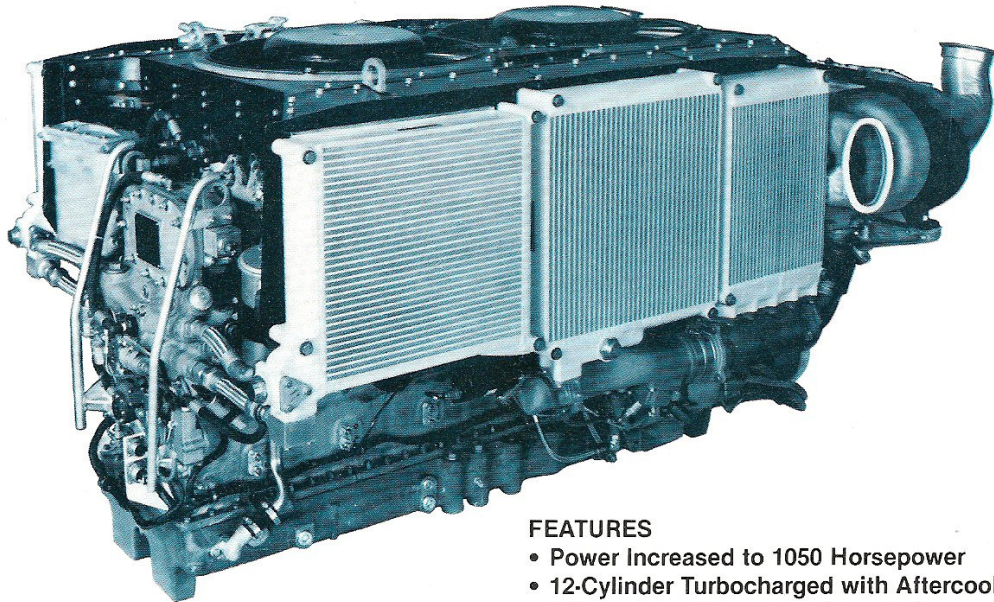


## AVDS-1790-5A SERIES ENGINE INSTALLATION DIMENSIONS





# Model AVDS-1790-8A Series Diesel Engine



## FEATURES

- Power Increased to 1050 Horsepower
- 12-Cylinder Turbocharged with Aftercooling
- 650 Ampere Alternator (oil cooled)
- Compact Design — Same Size as 750 Horsepower Engine
- High Power-to-Weight Ratio

## DESCRIPTION

The Continental AVDS-1790-8A Series engine is an air-cooled 90° upright Vee design, 12-cylinder turbocharged diesel engine — rated at 1050 gross horsepower at 2400 rpm. Air cooling for engine cylinders, as well as the engine and transmission oil coolers and induction air aftercoolers, mounted rearward of the engine oil coolers, is provided by two engine-driven fans mounted in the center of the Vee. Extensive use of aluminum components throughout the engine provides a high power-to-weight ratio.

The AVDS-1790-8A is a high horsepower engine. It is an open-chamber engine incorporating air cooling which eliminates the maintenance burden of liquid cooling systems.

The AVDS-1790-8A Series engine has been designed and developed for use in the combat environment. It is completely waterproof and can be totally submerged with only the addition of combustion snorkels. Cold starting has been simplified by the addition of an automatic intake flame heater. The cooling system has been designed for successful operation at ambient temperatures up to 125°F.

The AVDS-1790-8A engine is an up powered version of the AVDS-1790-2C engine with over 80 percent commonality of parts between the two diesel powered engines.



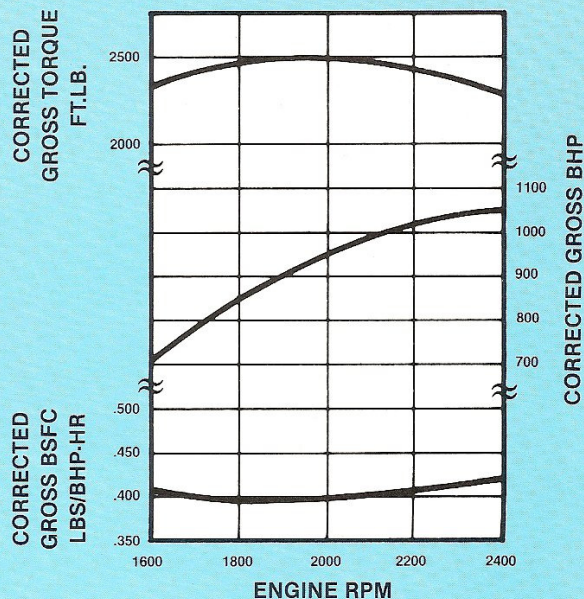
# SPECIFICATIONS

## PERFORMANCE

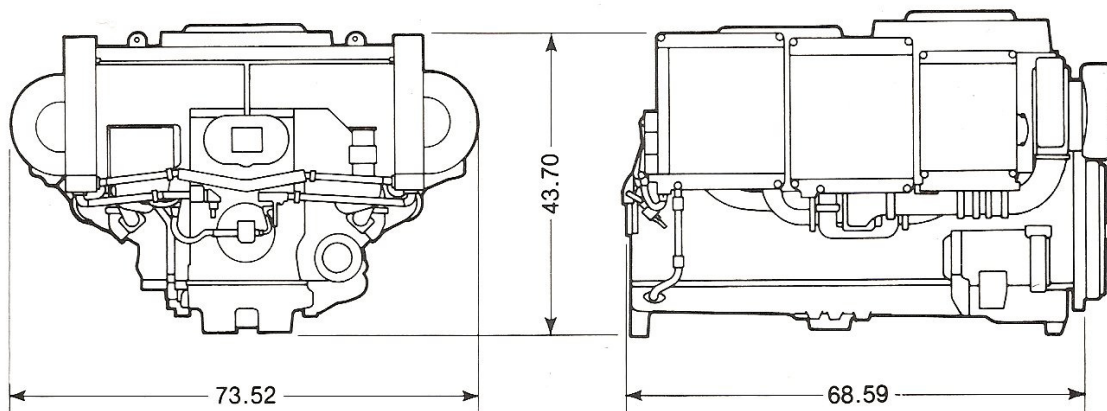
Displacement ..... 1790 cu. in.  
 Weight: Lbs. dry (with accessories) ..... 5100  
 Horsepower, gross (at rated rpm) ..... 1050  
 Horsepower, net (at rated rpm) ..... 892  
 Speed      Governed (full load) ..... 2400 rpm  
              Governed (no load) ..... 2640 rpm  
              Low Idle ..... 700 rpm  
 Cylinders: Number ..... 12  
              Arrangement ..... 90 degrees, V.  
              Bore ..... 5.75 inch  
              Stroke ..... 5.75 inch  
 Camshafts: Number ..... 2  
              Arrangement ..... Overhead  
 Ignition: ..... Compression  
 Air System: Induction Airflow  
              (at rated power  
              and speed) ..... 2450 cfm  
 Fuel type ..... DF-A, DF-1, DF-2  
 Fuel Consumption: At (2400 rpm) ..... 430 lbs/hr.  
 Lubrication: Capacity for dry engine ..... 21 gal.  
              Capacity for oil change ..... 18 gal.  
 Normal oil temperature ..... 180°F at 60°F Ambient  
 Maximum oil temperature ..... 260°F at 115°F Ambient

Cooling System: Includes Transmission Coolers

PERFORMANCE AT 29.92 IN. HG AND  
60°F WITH DF-2 FUEL AT 60°F

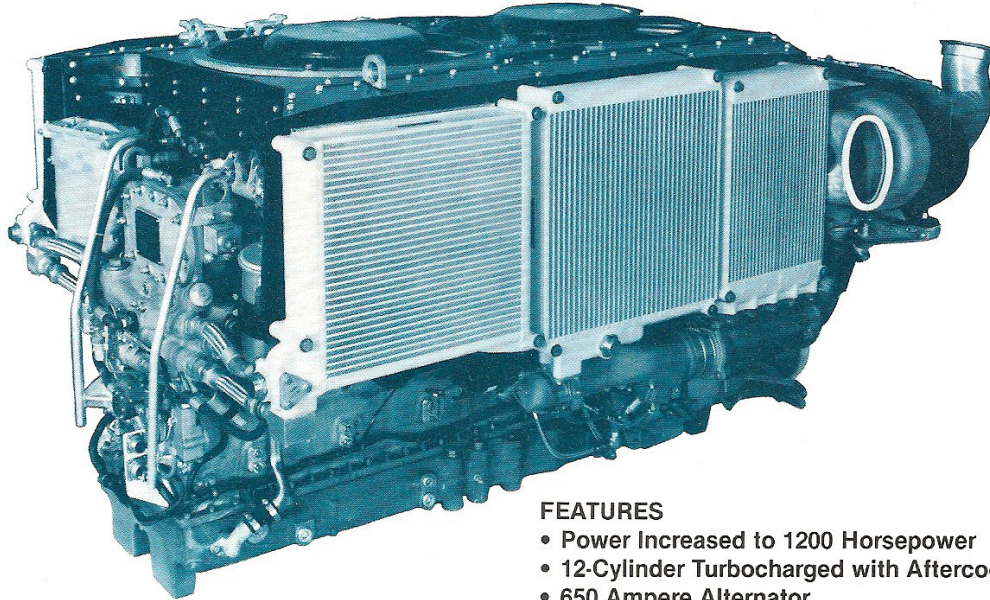


## AVDS-1790-8A SERIES MAJOR ENGINE DIMENSIONS





# Model AVDS-1790-9A Series Diesel Engine



## FEATURES

- Power Increased to 1200 Horsepower
- 12-Cylinder Turbocharged with Aftercooling
- 650 Ampere Alternator
- Compact Design — Same Size as 750 Horsepower Engines
- High Power-to-Weight Ratio

## DESCRIPTION

The Continental AVDS-1790-9A Series engine is an air-cooled 90° upright Vee design, 12-cylinder turbocharged diesel engine-rated at 1200 gross horsepower at 2400 rpm. Air cooling for engine cylinders, as well as the engine and transmission oil coolers and induction air aftercoolers, mounted rearward of the engine oil coolers, is provided by two engine-driven fans mounted in the center of the Vee. Extensive use of aluminum components throughout the engine provides a high power-to-weight ratio.

The AVDS-1790-9A is a high horsepower engine. It is an open-chamber engine incorporating air cooling which eliminates the maintenance burden of liquid cooling systems.

The AVDS-1790-9A Series engine has been designed and developed for use in the combat environment. It is completely waterproof and can be totally submerged with only the addition of combustion snorkels. Cold starting has been simplified by the addition of an automatic intake flame heater. The cooling system has been designed for successful operation at ambient temperatures up to 125°F.

The AVDS-1790-9A engine is an up powered version of the AVDS-1790-2C engine with over 70 percent commonality of parts between the two diesel powered engines.



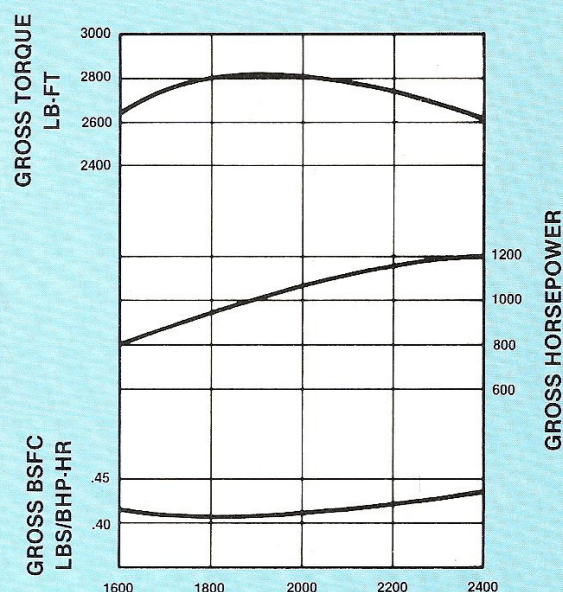
# SPECIFICATIONS

## PERFORMANCE

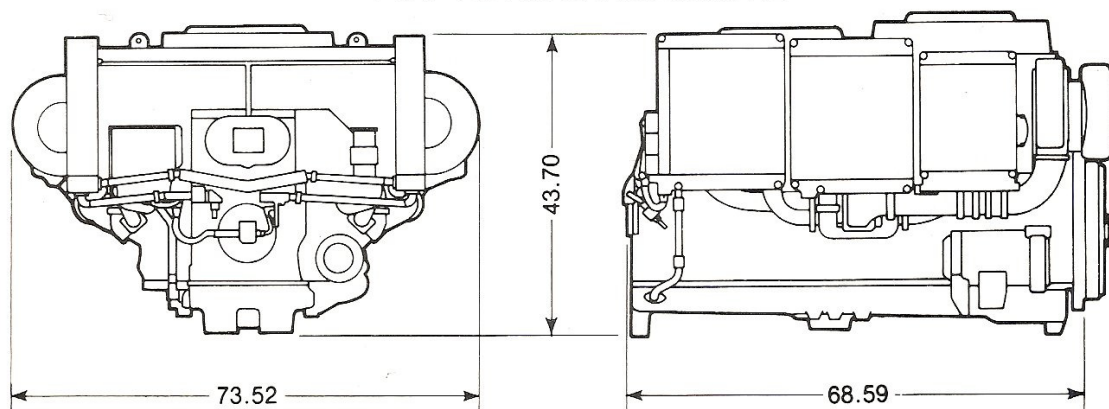
Displacement ..... 1790 cu. in.  
 Weight: Lbs. dry (with accessories) ..... 5100  
 Horsepower, gross (at rated rpm) ..... 1200  
 Horsepower, net (at rated rpm) ..... 1000  
 Speed: Governed (full load) ..... 2400 rpm  
           Governed (no load) ..... 2640 rpm  
           Low Idle ..... 700 rpm  
 Cylinders: Number ..... 12  
               Arrangement ..... 90 degrees, V.  
               Bore ..... 5.75 inch  
               Stroke ..... 5.75 inch  
 Camshafts: Number ..... 2  
               Arrangement ..... Overhead  
 Ignition ..... Compression  
 Air System: Induction Turbocharged  
               airflow (at rated power  
               and speed) ..... 2800 cfm  
 Fuel type ..... DF-A, DF-1, DF-2  
 Fuel Consumption: At (2400 rpm) ..... 480 lbs/hr.  
 Lubrication: Capacity for dry engine ..... 21 gal.  
               Capacity for oil change ..... 18 gal.  
 Normal oil temperature ..... 180°F at 60°F Ambient  
 Maximum oil temperature ..... 260°F at 115°F Ambient

Cooling System: Includes Transmission Coolers

PERFORMANCE AT 29.92 IN. HG AND  
60°F WITH DF-2 FUEL AT 60°F



## AVDS-1790-9A SERIES MAJOR ENGINE DIMENSIONS





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